NEW YORK CENTRAL LINES

Signal and Train Control Committee
STANDARDS

March 15, 1950

			Ⓒ Con't.
●1371C	M-1941	CLAMP:	Ladder, and stays-Details and Assembly
●1641C	M-1947	"	Crossing sign - Details
●1647D	"	"	Adapter-For crossing signs - Details
●1093	Dec.1913	CLEARANCE:	Spectacle
3881A	6-12-47	CLIP:	Guide - Details and Assembly
405A	7-22-41	COMPOUNDS:	Sealing-Ordering reference and instructions
●1014D	M-1946	COMPENSATOR:	One-way horizontal pipe-Detail and Assembly
1156B	7-23-42	CONNECTORS:	Track circuit - Assembly
6860A	4-29-46	"	Terminal, and testing links - Details
●1195B	M-1941	CONNECTIONS:	Operating Mechanical Signals-Assembly
3010A	12-10-49	"	Intermediate Throw Rod - Layout
415A	7-22-39	CONTROLLERS:	Switch circuit - Instructions
●1409	Dec.1919	COTTERS:	Size, drilling, location
●1015B	M-1944	COUPLING:	One-inch signal and pipe - Details and Assembly
4937A	8-10-42	COVERS:	Inductor cable entrance, and cable clamps - Details and Assembly
●1053B	M-1926	"	Battery - Details
3907C	5-28-48	CRANK:	Forged - Details

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●1007B	M-1940	CRANK:	Forged - Details
●1013C	M-1943	"	Pipe compensator - Details
			Ⓓ
81A	4-14-45	DERAIL:	Siding and yard tracks - Requisites
3870A	2-15-50	"	Block and Switch-Point Type
3890A	1-15-48	"	Switch connected-non-interlocked layout
3898A	11-11-46	"	Guide box and rail shims - Details and Assembly
435B	4-20-37	DESIGNATIONS:	Relay contact Post - Instructions
6083A	11-4-43	DRILLING:	For rail-head plug type bond-Detail
			Ⓔ
036B	5-18-36	ESTIMATES:	Signal-Form SC-36
6955B	4-2-45	EYELETS:	And wire terminals

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01C	6-9-41	FORM:	SC-1 Signal and A.T.S. report
"	"	"	SC-2 " interl'g & A.T.S. failure report
"	"	"	SC-3 " and A.T.S. report-Maintainer's
04A	4-13-38	"	SC-4 " performance report
"	"	"	SC-5 " performance consolidation
06A	2-3-43	"	SC-6 " report-Auto. block signal interl'g and A.T.S. record
"	"	"	SC-7 " special handling of levers
08C	7-26-43	"	SC-8 Office test record of D.C. apparatus
"	"	"	SC-9 Signal repair tag
"	"	"	SC-10 D. C. Relay paster
011A	9-30-42	"	SC-11 Record of removal and replacement of D. C. apparatus
"	"	"	SC-12 Field test record of D. C. apparatus
013A	11-6-46	"	SC-13 Signal employees record
"	"	"	SC-14 " log-book label
016B	1-18-40	"	SC-16 Highway crossing signal movements
"	"	"	SC-17 " " protection performance
SC-18A	1-31-30	"	SC-18 Relay record paster-A.C. apparatus
"	"	"	SC-19 Field test record A. C. apparatus

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SC-18A	1-31-30	FORM:	SC-20	A. C. Relay requirement table
021A	12-12-41	"	SC-21	Removal or installation of A. C. apparatus.
"	"	"	SC-22	Office test record of A. C. apparatus
"	"	"	SC-23	Report of damage to Signal Department apparatus
24B	7-23-31	"	SC-24	Field test record of A.T.S. inductors and connections
"	"	"	SC-25	Office test record of A.T.S. inductors and connections
026C	2-18-38	"	SC-26	Car test record of A.T.S. inductors and connections
"	"	"	SC-27A	Storage battery record
028A	7-15-42	"	SC-28	Field test record-electric interl'g
"	"	"	SC-29	Ground test record
46A	7-21-32	"	SC-30	Signal cable splices
032B	11-5-47	"	SC-31	Signal Progress Report
"	"	"	SC-32	Signal work schedule and report
"	"	"	SC-32A	Signal work schedule
033B	7-21-34	"	SC-33	Forwarding notice
"	"	"	SC-34	Signal work report

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46A	7-21-32	FORM:	SC-35	Signal counter readings
036B	5-18-36	"	SC-36	" estimates
"	"	"	SC-37	" units
038B	5-15-36	"	SC-38	" Inspectors report
"	"	"	SC-39	" battery charging plants
040B	7-21-34	"	SC-40	" construction order
"	"	"	SC-41	" friction tape test
042B	11-27-43	"	SC-42	" out of service notice
"	"	"	SC-43	" gang work
044B	9-30-42	"	SC-45	" electric lamps
56A	6-7-33	"	SC-46	" wire and cable failures
"	"	"	SC-47	" insulation resistance tests
048A	11-24-43	"	SC-48	D.C. relay requirement table-Inst'ns.
051A	3-18-36	"	SC-51	Signal-A.C. track circuit readings
053B	8-1-49	"	SC-53	Signal charges
54A	6-7-33	"	SC-54	" arrester ground tests
55A	12-20-33	"	SC-55	" material performance
056A	4-2-35	"	SC-56	" examination-qualification report
"	"	"	SC-57	" locking sheet

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058B	4-28-49	FORM:	SC-58 D.C. track circuit test record (AAR 7021)
"	"	"	SC-59 Signal and interl'g unit dist'n. (AAR 7050)
060A	11-26-43	"	SC-60 Signal and A.T.S. report
071A	10-1-42	"	SC-71 Signal failure report (I.C.C. No. 1)
"	"	"	SC-72 Signal failure report (I.C.C. No. 2)
3910A	Feb.1922	FOUNDATION:	Pipe Carrier, and pipe runs - Details and Assembly
●1052B	M-1946	"	Ladder - Detail
●1103B	M-1947	"	Concrete-For horizontal crank stands-Detail
●1104B	"	"	Concrete-For compensator-Detail
●1107D	M-1943	"	" -For ground mast signals-Detail
●1687B	M-1945	"	Highway crossing-For cantilever mast-Detail
●1694A	M-1939	"	Precast-For 4 in. mast - Details and Assemblies
●1695A	"	"	Precast-For 4 in. mast - Details
●1101B	M-1926	FOUNT:	Oil - Detail

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4940B	1-9-46	GAGE:	Inductor-Receiver - A.T.S. - Details and Assembly
325C	6-11-45	GREASES:	Ordering references and instructions
●1023C	M-1945	GUIDE:	For vertical connections on signals - Assembly
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●1363B	M-1941	HAND-RAILS:	Ladder - Details and Assembly
		Ⓘ	
4930A	8-10-42	INDUCTOR-A.T.S.:	Layout
4935A	"	" "	Fastenings - assemblies
4936A	"	" "	" - details
4942A	1-20-40	" "	Dummy - Assembly
4941A	7-9-41	INDUCTOR-RECEIVER-A.T.S.:	Relative location
26B	2-5-45	INSTRUCTIONS:	Battery, caustic soda (1-2-3)
30B	9-30-43	"	" , nickel-iron storage

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35B	9-30-43	INSTRUCTIONS:	Battery, lead-type storage (1-2)
36A	12-8-49	"	Installation of Rail Signal Bonds
40A	1-31-40	"	Relays, A. C.,and indicators (1 to 34)
80A	8-15-39	"	Bars, detector
183A	1-25-40	"	Highway crossing protection performance
200A	9-1-39	"	Rules, I.C.C., and standards (1 to 8)
201A	8-8-42	"	Reports, signal failures, SC-71-72 (1 to 3)
205A	7-22-39	"	Interlocking, electric (1-2-4-5-; 3=205B)
210A	"	"	Interlocking, mechanical and electro-mechanical (1-2)
215A	8-15-39	"	Inspectors
250A	8-15-39	"	Lamps, switch and signal
255C	6-22-49	"	Arresters, lightning-ordering references
256A	3-3-45	"	Arrester grounds - Lightning
260A	7-22-39	"	Locking, mechanical (1-2)
265A	8-15-39	"	Locks, electric (2)
265B	1-15-40	"	" , " (1)

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325C	6-11-45	INSTRUCTIONS:	Oils and greases-ordering references
350B	8-31-48	"	Painting-ordering references
365A	1-18-43	"	Pole lines joint with W.U.
366A	2-20-45	"	Pole lines joint with W.U. (1-2)
390B	7-15-44	"	Relays, D.C., and specifications (1 to 146)
393A	8-1-45	"	Relay, D.C., Purchase list-Plug in type (4-7)
"	"	"	Relay, D.C., Specifications-Plug in type (7 to 77)
401A	4-28-36	"	Interlocking, automatic aspects-requirements
405A	7-22-41	"	Compounds, sealing-ordering references
410A	8-15-39	"	Signals, color light type
415A	7-22-39	"	Controllers, switch circuit
420A	8-15-39	"	Safely securing of switches and signals
421A	"	"	Switches, spring
434A	"	"	Releases, time
435B	4-20-37	"	Posts, relay contact designations
436A	7-22-39	"	Wayside equipment A.T.S.

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440B	1-15-40	INSTRUCTIONS:	Circuits, track
E485E	8-31-46	"	Wires and cables-ordering references (1-2)
●1536B	M-1940	"	Compensation
56A	6-7-33	INSULATION:	Signal-Resistance tests. Form SC-47
●1055D	M-1943	"	Switch rod - Details and Assembly
●1094E	"	"	Pipe line - Details and Assembly
205A	7-22-39	INTERLOCKING:	Electric (1-2-4-5-; 3=205B) Instructions
210A	"	"	Mechanical and electro-mechanical (1-2) Instructions
401A	4-28-36	"	Automatic-Aspects, Requirements and Instructions

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●1053B	M-1926	JAR:	Battery - Details
●1016C	M-1940	JAW	Screw and solid - Details
●1018B	M-1941	"	Solid, with tang end - Assembly
●1019C	M-1940	"	Tang-end, and adjustable link - Details and Assembly

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●1360B	M-1941	JAW:	Screw, tang-end - Details and Assembly
2301C	3-18-36	JOINT:	Insulated, location of (1,6; 2, 3, 4, 5, 7, 8=2301B)
			Ⓛ
013A	11-6-46	LABEL:	Signal log book - Form SC-14
●1362C	M-1941	LADDER:	Parts - Details
●1365C	"	"	Ground mast signal-Assembly
●1366C	"	"	Bridge mast - Assemblies
●1583C	M-1945	"	Ground mast signal-Assembly
●1585C	"	"	Parts - Details
044B	9-30-42	LAMP:	Signal electric - Form SC-45
250A	8-15-39	"	Switch and signal-Instructions
750A	8-26-39	"	Signal Electric (1-2; 3=750C)-Specifications
760B	9-17-47	"	One-Direction Hwy. crossing Flashing Lgt.-Specifications
2001D	1-22-45	"	Switch - 31 oz. oil fount - Details and Assembly
2002A	1-25-40	"	Switch and Signal - Parts (Oil) - Details

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2003C	11-3-43	LAMP:	Switch and Signal - Parts (oil) - Details
●1100B	M-1926	"	Semaphore - one lens - Assembly
●1101B	"	"	Fount - 31 oz. - Details
2303A	2-27-30	LAYOUT:	Single Switch - Division of material and maintenance
3000A	12-16-38	"	Single Switch - with G.R.S. Co. Mod. 5A Machine
2280A	1-23-39	LETTERS:	and numerals - Details
●1557B	M-1946	"	Details
06A	2-3-43	LEVER:	Signal-Special handling of Form SC-7
3705A	5-8-48	"	Throw-over - Details and Assembly
4890A	2-28-40	LIGHT:	Track pan - Location
●1238A	Mar.1914	"	Marker - Details and Assembly
6860A	4-29-46	LINK:	Testing, and terminal connectors - Details
●1017C	M-1942	"	Compensator - Details and Assembly
265B	1-15-40	LOCK:	Electric (1;2=265A) - Instructions
●1425E	M-1943	"	Plunger switch - assembly and details
●1426D	"	"	" " - details
056A	4-2-35	LOCKING:	Sheet, Signal - Form SC-57

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260A	7-22-39	LOCKING:	Mechanical (1-2) - Instructions
3700A	8-6-49	"	Bolt. Lever machine operated - For Crossover - Layout
3710A	"	"	" Throw-Over Lever operated - For Crossover - Layout
●1017C	M-1942	LUG:	Tang end - Details and Assembly

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●1197	Dec.1915	MACHINE:	Two-lever wall - Details and Assembly
●1397	"	"	" " " - Details
2020A	1-25-40	MARKER:	Lever - Details
2021A	"	"	Lever - Details and Assemblies
●1613A	M-1934	"	For spring switch - Detail
●1035C	M-1946	MAST:	Signal - Details and Assembly
●1616C	M-1947	"	Light signal - Details

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033B	7-21-34	NOTICE:	Forwarding - Form SC-33

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042B	11-27-43	NOTICE:	Out of service - Form SC-42
2280A	1-23-39	NUMERAL:	For marking switches and signals
●1650C	M-1947	"	For track signs - Details
●1557B	M-1946	"	Details
1141A	1-23-41	NUTS:	For G.R.S. Type 'B' car retarder - specifications

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325C	6-11-45	OIL:	Ordering references, Instructions
830A	1-31-39	"	Long-time burning illuminating - specification
040B	7-21-34	ORDER:	Construction - Form: SC-40

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350B	8-31-48	PAINTING:	Ordering references, Instructions (1-2-3)
08C	7-26-43	PASTER:	D. C. Relay - Form SC-10
●1010G	M-1944	PIN:	Crank and jaw - Details

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2313A	6-24-31	PINNACLE:	For 3½, 4 and 5 in. pipe masts - Detail
•1015B	M-1944	PIPE:	1 in. signal, and coupling - Detail and Assembly
3004A	12-8-38	PLATE:	Saddle - G.R.S. Mod. 5A Machine - Detail
3894A	7-25-49	"	Tie - For Block Type Derail
3904B	4-5-48	"	Plunger lock-mechanical F.P.L. - Detail
"	"	"	Base - For Crank Stand
•1437A	M-1942	"	Preferred thicknesses for uncoated plate
•1364C	M-1941	PLATFORMS:	Ladder - Details and Assembly
•1058B	M-1938	POST:	Anchor-cast iron - Detail
•1281A	M-1942	"	Concrete - Details

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6500A	10-8-41	RECEPTACLE:	Lamp - for indicators and track charts - Details and Assembly
27A	11-8-32	RECTIFIERS:	Specifications (1-2-3); 2A=27A of 2-15-46
434A	8-15-39	RELEASES:	Time - Instructions
881B	9-23-47	RESISTORS:	Specifications (1-2-3)

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2721A	11-2-46	RODS:	Derail - Detail and Assemblies
3001D	10-15-48	"	Front - For single switch - Details and Assembly
3002C	10-10-49	"	Throw - Details and Assemblies
3003B	10-15-48	"	Lock-For G.R.S. Mod. 5A Machine - Details
3005C	4-8-46	"	Point-detector-For G.R.S. Mod. 5A Machine - Details and Assemblies
3006D	"	"	Switch circuit controller and point - Detector Rod Fittings
3706A	6-7-48	"	Tang End
3896A	4-12-46	"	Connecting - Details and Assemblies
3902A	12-5-38	"	Throw-For mechanical interlocked switch - Detail
3903A	12-9-38	"	Lock-For mechanical interlocked switch - Details
3905C	4-8-46	"	Switch circuit controller - Details and Assemblies
3906A	12-6-38	"	Connecting - Details and Assemblies
5720A	3-23-37	"	Front-For split-point derail - Details and Assemblies
6315A	5-22-45	"	Ground-sectional - Details and Assemblies
•1195B	M-1941	"	Spectacle Eye - Detail

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200A	9-1-39	RULES:	I.C.C. and standards, (1 to 8) Instructions
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032B	11-5-47	SCHEDULE:	Signal work - Form SC-32
032B	"	"	" " - Form SC-32A
●1002B	M-1940	SCREW:	Pipe adjusting - Details and Assembly
6865A	7-9-44	SEALS:	Wire-entrance and Terminal Boxes (1-2-3) Details and Assemblies
●1062B	M-1944	SHAFT:	Rocking-Assembly and details
46A	7-21-32	SIGNAL:	Counter readings - Form SC-35
410A	8-15-39	"	Color light type - Instructions
2312A	7-20-34	"	Highway crossing - Assembly
●1043D	M-1938	"	Mechanical-One-arm ground - Assembly
●1195B	M-1941	"	Mechanical-Operating Connections-Detail
●1239B	M-1946	"	Mechanical dwarf - Fittings - Details
●1686E	M-1947	"	Highway crossing-cantilever, 6 and 8 ft. span - Assembly
●1688C	"	"	Highway crossing-cantilever, 10 and 12 ft. span - Assembly

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4820A	6-10-43	SIGN:	Permanent stop - Detail
4830A	"	"	Temporary stop - "
4840B	12-20-45	"	Marking end auto. block - Detail
4841A	7-19-48	"	Marking End of Track Circuit
4982B	5-10-48	"	Marking A.T.S. territory - Detail
●1640C	M-1947	"	Crossing-90° cast iron - Details and Assembly
●1642D	"	"	Crossing-90° reflector-assembly
●1643D	"	"	" -90° " - details
●1645C	"	"	Track-reflector-assembly and details
●1646C	"	"	Stop on red signal - Detail and Assembly
27A	11-8-32	SPECIFICATIONS:	Rectifiers (1-2-3); 2A=27A of 2-15-46
33A	3-17-27	"	Chimney, long-time burner
84B	4-2-35	"	Tape, friction (1-2)
85A	8-20-35	"	" , rubber (1-2)
750A	8-26-39	"	Signal electric lamps (1-2;3=750C)
760B	9-17-47	"	One-dir'n H'way xing flash'g-light lamp unit (1-2)
830A	1-31-39	"	Oil, long-time burning illuminating

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881B	9-23-47	SPECIFICATIONS:	Resistors (1-2-3)
●1040C	M-1946	SPECTACLE:	Semaphore-Design 'A' - Details
●1041C	M-1945	"	Semaphore-Design 'A' - Details
●1093	M-1913	"	Clearance diagram
●1233B	M-1946	"	Mechanical dwarf signal - Details and Assembly
46A	7-21-32	SPLICES:	Signal cable - Form SC-30
●1586A	M-1926	"	Locking Bar - S & F Machine -Details
●1008C	M-1946	STAND:	One-way horizontal crank - Details
●1011D	"	"	" " " " -Assembly
●1014D	"	"	Compensator-one-way detail and assembly
●1066C	M-1945	"	Single vertical crank - Details and Assembly
●1067	Nov.1913	"	Multiple vertical crank - Details
●1393C	M-1946	"	Horizontal crank-two-way separate pin - Details and Assembly
●1399C	M-1944	"	Low target - Details and Assembly
●1371C	M-1941	STAYS:	Ladder - Details and Assembly
3909C	11-13-48	STRAP:	Tie - Details
●1271A	M-1940	STUDS:	Ball - Details and Assembly

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●1022C	M-1945	SUPPORT:	Guide - For vertical connections on signals - Details
421A	8-15-39	SWITCH:	Spring - Instructions
2303A	2-27-30	"	Single-Division of material and maintenance layout
3900A	12-14-38	"	Single-Mechanical F.P.L. Layout
●1660A	M-1934	SYMBOLS:	Graphical - Wayside Signal operating characteristics
●1661B	M-1944	"	" - Signal Supports
●1662C	M-1947	"	" - Track and Highway Crossings
●1663B	M-1944	"	" - Buildings, Bridges and Tunnels
●1664B	"	"	" - Wayside Fixtures
●1665B	"	"	" - Switches
●1666B	"	"	" - Derails
●1667B	"	"	" - Miscellaneous devices applied to tracks
●1668B	"	"	" - Lead-outs, Bolt locks, Cranks and Deflecting Bars
●1669B	"	"	" - Pipe and Wire lines
●1673B	M-1943	"	" - (1-2) - Relays
●1674C	M-1947	"	" - " - Relay contacts

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•1675B	M-1943	SYMBOLS:	Graphical - (1-2) - Circuit controller contacts miscellaneous
•1676B	"	"	" - Circuit controller contacts
•1677B	"	"	" - (1-2) - Contacts
•1678B	"	"	" - Signal and Electro-penumatic
•1679B	"	"	" - Indicators, Locks, Buzzers and Bells
•1680B	"	"	" - Circuit Appurtenances
•1681B	"	"	" - Miscellaneous Apparatus
		Ⓣ	
SC-18A	1-31-40	TABLE:	Requirement-A.C. Relays - Form SC-20
048A	11-24-43	"	Requirement - D. C. Relays
464B	5-22-45	"	Unit-Signal and interlocking (A.A.R. Part 203)
08C	7-26-43	TAG:	Signal repair - Form SC-9
2700A	7-10-41	"	For marking wires - Details
•1017C	M-1942	TANG END:	Lug and compl. Link - Details and Assembly
•1019C	M-1940	" "	Jaws and adjustable link - Details and Assembly
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•1360B	M-1941	TANG END:	With Screw Jaw
•1376B	M-1942	" "	Double
84B	4-2-35	TAPE:	Friction-Specification (1-2)
85A	8-20-35	"	Rubber- " (1-2)
2720A	11-2-46	TARGET:	Derail - Details and Assembly
6955B	4-2-45	TERMINALS:	Wire - Details and Chart
6955B	"	"	" and Eyelet
•1375B	M-1935	THERMOMETER:	Storage battery - Detail
3009A	2-2-39	TIE:	Switch-G.R.S. Mod. 5A Machine and mechanical - Details
3019A	2-4-39	"	Switch-G.R.S. Mod. 5A Machine - Details
3899A	4-17-46	"	Switch-For sw. conn. blk. type derail-Details
4939A	8-10-42	"	Inductor-A.T.S. - Details
2765B	9-20-48	TOOL-BOARD:	And Equipment
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•1458C	M-1935	WASHER:	Cast iron - Detail

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NEW YORK CENTRAL SYSTEM – SIGNAL AND TRAIN CONTROL COMMITTEE
DRAWINGS – SPECIFICATIONS – INSTRUCTIONS – INCLUDING ADOPTED A.A.R. STANDARDS

ALPHABETICAL INDEX
1-3-1944

• 1060	Oct. 1912	ARM:	Rocking shaft	Ⓐ
• 1690A	M-1942	BASE:	For 8 in. mast	Ⓑ
• 1036B	M-1935	"	Socket, 5 in. bridge mast	
• 1250A	"	"	" 5 in. mast	
• 1193B	M-1941	"	Suspension, 5 in. mast	
• 1082	Mar. 1920	BEARING:	Semaphore, mechanical - detail	
• 1194	"	"	" " - assembly	
200B	1-13-32	BLADE:	Signal	
• 1054C	M-1941	BLOCK:	Terminal, multiple unit	
2651B	10-23-33	"	"	
2020A	1-25-40	"	Lever markers	
2021A	"	"	" "	
2765A	"	BOARD:	Tool equipment	
700B	1-28-32	BOLT:	Hook	
1142A	1-23-41	"	G.R.S. Type 'B' car retarder	
6083A	11-4-43	BOND:	Drilling for rail-head-plug type	
2318B	12-20-35	"	Grounding of oil sidings	
1156B	7-23-42	"	Plug type, and track circuit connectors	
• 1266C	M-1941	BOX:	Battery, concrete - assemblies	
• 1267C	"	"	" " - details	
• 1268C	"	"	" " - "	
• 1269B	M-1939	"	" " - "	
• 1225B	M-1926	"	Stuffing, 1 in. pipe	
6868B	4-12-43	"	Test - highway crossing signals	
• 1049A	Mar. 1914	BRACKET:	Lamp, adjustable	
2307A	3-3-30	BRACE:	Rail, 127 lb. - inside type	
2900D	8-24-17	"	" 80 and 105 lb.	
2920C	9-0-23	"	" " " "	
2940B	1-13-28	"	" 127 lb. and butt strap	
• 1084B	M-1928	CARRIER:	Pipe - assembly	Ⓒ
• 1085B	"	"	" - detail	

• 1074B	M-1938	CARRIER:		Pipe, one-way	Cont'd. Ⓒ
• 1059A	Dec. 1915	CLAMP:		Base of ground mast	
• 1083	Feb. 1914	"		'U' bolt for 5 in. mast	
• 1007B	M-1940	CRANK:		Forged	
• 1013B	M-1927	"		Pipe compensator	
3907A	12-8-38	"		Forged	
					Ⓓ
					Ⓔ
01C	6-9-41	FORM:	SC-1	Signal and A.T.S. report	Ⓕ
"	"	"	SC-2	" interl'g and A.T.S. failure report	
"	"	"	SC-3	" and A.T.S. report - maintainer's	
04A	4-13-38	"	SC-4	" performance report	
"	"	"	SC-5	" " consolidation	
06A	2-3-43	"	SC-6	" rep't-Aut. blk. sig., interl'g and A.T.S. record	
"	"	"	SC-7	" - special handling of levers	
08C	7-26-43	"	SC-8	Office test record of D.C. apparatus	
"	"	"	SC-9	Signal repair tag	
"	"	"	SC-10	D.C. relay paster	
011A	9-30-42	"	SC-11	Record of removal and replace't of D.C. appar.	
"	"	"	SC-12	Field test record of D.C. apparatus	
013A	12-31-43	"	SC-13	Signal employes record	
"	"	"	SC-14	" log book - paster	
016B	1-18-40	"	SC-16	Highway crossing signal movements	
"	"	"	SC-17	" " protection performance	
SC-18A	1-31-30	"	SC-18	Relay record paster - A.C. apparatus	
"	"	"	SC-19	Field test record A.C. apparatus	
"	"	"	SC-20	A.C. relay requirement table	
021A	12-12-41	"	SC-21	Removal or installation of A.C. apparatus	
"	"	"	SC-22	Office test record of A.C. apparatus	
"	"	"	SC-23	Report of damage to signal dep't apparatus	
24B	7-23-31	"	SC-24	Field test record of A.T.S. inductors and conns.	
"	"	"	SC-25	Office " " " " " " "	
026C	2-18-38	"	SC-26	Car " " " " " " "	
"	"	"	SC-27	Storage battery record	

(• — Indicates A. A. R. Drawings —— Titles emphasized by the noun)

(CONT'D ON PAGE A2)

SPECIFICATION DEPT.
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028A	7-15-42	FORM:	SC-28	Field test record-electric int'g.-Cont'd. Ⓕ
"	"	"	SC-29	Ground test record
46A	7-21-32	"	SC-30	Signal cable splices
50A	6-21-32	"	SC-31	" progress report
"	"	"	SC-32	" work schedule and report
033B	7-21-34	"	SC-33	Forwarding notice
"	"	"	SC-34	Signal work report
46A	7-21-32	"	SC-35	" counter readings
036B	5-18-36	"	SC-36	" estimates
"	"	"	SC-37	" units
038B	5-15-36	"	SC-38	" inspectors report
"	"	"	SC-39	" battery charging plants
040B	7-21-34	"	SC-40	" construction order
"	"	"	SC-41	" friction tape test
042B	11-27-43	"	SC-42	" out of service notice
"	"	"	SC-43	" gang work
044B	9-30-42	"	SC-45	" electric lamps
56A	6-7-33	"	SC-46	" wire and cable failures
"	"	"	SC-47	" insulation resistance tests
048A	11-24-43	"	SC-48	D.C. relay requirement table-Inst'ns.
051A	3-18-36	"	SC-51	Signal-A.C. track circuit readings
052B	8-15-34	"	SC-52	" time report
"	"	"	SC-53	" charges
54A	6-7-33	"	SC-54	" arrester ground tests
55A	12-20-33	"	SC-55	" material performance
056A	4-2-35	"	SC-56	" examination-qualification report
"	"	"	SC-57	" locking sheet
058B	11-24-43	"	SC-58	D.C. track circuit test record (AAR 7021)
"	"	"	SC-59	Signal and interl'g unit dist'n. (AAR 7050)
060A	11-26-43	"	SC-60	" " A.T.S. report
071A	10-1-42	"	SC-71	Signal failure report (I.C.C. No.1)
"	"	"	SC-72	" " " (I.C.C. No.2)

• 1687A	M-1942	FOUNDATION:	Highway crossing signal-cantilever. Cont'd.	Ⓕ
• 1052	Dec.1913	"	Ladder	
• 1694A	M-1939	"	Precast, 4 in. mast-assemblies	
• 1695A	"	"	" " " -details	
3910A	2-0-22	"	Pipe runs	
• 1021	Jun.1917	GUIDE:	Clamps for vertical connections on signals	Ⓖ
• 1023B	M-1935	"	Complete " " " " "	
• 1022B	"	"	Supports " " " " "	
2302A	7-9-29	"	Clip for split-point derails	
				Ⓗ
4937A	8-10-42	INDUCTOR-A.T.S:	Cable entrance covers and cable clamp	Ⓘ
4942A	1-20-40	" "	Dummy	
4935A	8-10-42	" "	Fastenings-assemblies	
4936A	"	" "	" -details	
4930A	"	" "	Layout	
4940A	1-20-40	" "	Receiver gage	
4941B	7-9-41	" "	" - relative location	
4939A	8-10-42	" "	Ties	
• 1094D	M-1941	INSULATION:	Pipe line	
• 1055C	M-1936	"	Switch rod	
255A	3-8-41	INSTRUCTION:	Arresters, lightning-ordering references	
26A	7-22-39	"	Battery, caustic soda (1-2)	
29C	9-30-43	"	" installation of lead-type storage	
35B	"	"	" lead-type storage (1-2)	
30B	"	"	" nickel-iron storage	
80A	8-15-39	"	Bars, detector	

(CONT'D ON PAGE A3)

440B	1-15-40	INSTRUCTION:	Circuits, track Cont'd.	Ⓘ
405A	7-22-41	"	Compounds, sealing-ordering references	
415A	7-22-39	"	Controllers, switch circuit	
39B	7-20-34	"	Derails for sidings and yard tracks	
183A	1-25-40	"	Highway crossing protection performance	
215A	8-15-39	"	Inspectors	
401A	4-28-36	"	Interlocking, automatic aspects-requirements	
205A	7-22-39	"	" , electric (1-2-4-5; 3=205B)	
210A	"	"	" , mechanical and electro-mech'l. (1-2)	
250A	8-15-39	"	Lamps, switch and signal	
265B	1-15-40	"	Locks, electric (1)	
265A	8-15-39	"	" " (2)	
260A	7-22-39	"	Locking, mechanical (1-2)	
325B	7-9-41	"	Oils and greases-ordering references	
365A	1-18-43	"	Pole lines joint with W.U.	
435B	4-20-37	"	Posts, relay contact designations	
40A	1-31-30	"	Relays, A.C., and indicators (1 to 34)	
390A	4-30-41	"	" D.C., " specifications (1 to 61)	
434A	8-15-39	"	Releases, time	
201A	8-8-42	"	Reports, signal failures, SC-71-72 (1 to 3)	
200A	9-1-39	"	Rules, I.C.C., and standards (1 to 8)	

420A	8-15-39	INSTRUCTION:	Safety securing of switches and signals-Cont.	Ⓘ
410A	"	"	Signals, color light type	
421A	"	"	Switches, spring	
436A	7-22-39	"	Wayside equipment A.T.S.	
485A	8-15-39	"	Wires and cables (2)	
E485C	12-31-43	"	" " " -ordering references (1-1A)	
•1016C	M-1940	JAW:	Screw and solid	Ⓙ
•1018B	M-1941	"	Solid with tang-end	
•1019C	M-1940	"	Tang-end and adjustable link	
2301C	3-18-36	JOINT:	Insulated, location of (1; 2-8=2301B)	
E/C G-26	3-27-36	"	" continuous-Full 105 lb.	
E/C G-27	1-20-42	"	" " -one-end 105 lb.	
E/C G-28	"	"	" " - " 127 lb.	
E/C G-29	3-27-36	"	" " -Frog and switch	
E/C G-30	"	"	" " -one-end 112 lb.	
E/C G-31	"	"	" " -full 112 lb.	
				Ⓚ
•1366C	M-1941	LADDER:	Bridge mast	Ⓛ
•1371C	"	"	Clamps and stays	
•1365C	"	"	Ground mast signals	
•1363B	"	"	Hand-rails	

(CONT'D ON PAGE A4)

•1362C	M-1941	LADDER:	Parts	Cont'd. Ⓛ
•1364C	"	"	Platforms	
2002A	1-25-40	LAMP:	Parts for switch and signal (oil)	
2003C	11-3-43	"	" " " " " (")	
2001C	"	"	Switch - 31 oz. oil fount	
•1101B	M-1926	"	Fount - 31 oz.	
5700B	12-0-26	LAYOUT:	Derail, split point - F.P.L.	
5800C	4-7-31	"	" switch connected - noninterlocked	
5600A	7-22-26	"	" Hayes - F.P.L.	
4930A	8-10-42	"	Inductor A.T.S.	
3000A	12-16-38	"	Switch, single electric - G.R.S. Mod. 5A machine	
3900A	12-14-38	"	" " mechanical - F.P.L.	
2303A	2-27-30	"	" " - division of material and maintenance	
•1238A	Mar. 1914	LIGHT:	Marker	
4890A	2-28-40	"	Track pan	
•1425D	M-1940	LOCK:	Plunger switch - assembly	
•1426D	"	"	" " - details	
•1197	Dec.1915	MACHINE:	Two-lever wall - assembly	Ⓜ
•1397	"	"	" " - details	
2280A	1-23-39	NUMERAL:	And letters	Ⓝ
1141A	1-23-41	NUT:	G.R.S. Type 'B' car retarder	
				Ⓞ
•1010E	M-1935	PIN:	Crank and jaw	Ⓟ
2313A	6-24-31	PINNACLE:	For 5, 4 and 3½ in. pipe masts	
•1015A	M-1923	PIPE:	And coupling - 1 in. signal	

•1383A	M-1942	PLATE:	Butt end - insulated gage	Cont'd. Ⓟ
3904A	12-8-38	"	Plunger lock - mechanical F.P.L.	
•1437A	M-1942	"	Preferred thicknesses for uncoated thin flat metals	
3004A	12-8-38	"	Saddle - G.R.S. Mod. 5A machine	
•1058B	M-1938	POST:	Anchor - cast iron	
•1281A	M-1942	"	Concrete	
				Ⓠ
6500A	10-8-41	RECEPTACLE:	Lamp - indicators and track charts	Ⓡ
3906A	12-6-38	ROD:	Connecting	
5840D	4-7-31	"	Cranks - noninterlocked switch connected derail	
3006C	11-3-41	"	Fittings - switch cir. controller and pt-detector	
3001B	12-17-40	"	Front - single interlocked switch	
5720A	3-23-37	"	" - split-point derail	
3903A	12-9-38	"	Lock - mechanical interlocked switch	
3003A	12-12-38	"	" - G.R.S. Mod. 5A machine	
3005B	3-6-41	"	Point-detector - G.R.S. Mod. 5A machine	
3905B	"	"	Switch circuit controller	
3002A	12-7-38	"	Throw - G.R.S. Mod. 5A machine	
3902A	12-5-38	"	" - mechanical interlocked switch	
•1002B	M-1940	SCREW:	Pipe adjusting	Ⓢ
5606A	3-18-36	SHIM:	Hayes derail	
•1239	Sep.1914	SIGNAL:	Fittings - mechanical dwarf	
•1195B	M-1941	"	Operating connections - mechanical	

RECEIVED
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1944
SPECIFICATION DEPT.

2312A	7-20-34	SIGNAL:	Highway crossing	Cont'd. Ⓢ
•1688A	M-1942	"	" " – cantilever, 10 and 12 ft. span	
4982A	1-20-40	SIGN:	Marking A.T.S. Territory	
4820A	6-10-43	"	Permanent stop	
4830A	"	"	Temporary "	
•1040B	M-1931	SPECTACLE:	Semaphore – Design 'A'	
•1041B	M-1926	"	"	
33A	3-17-27	SPECIFICATION:	Chimney, long-time burner	
760A	3-30-40	"	One-dir'n h'way xing flash'g-light lamp unit (1-2)	
830A	1-31-39	"	Oil, long-time burning illuminating	
27A	11-8-32	"	Rectifiers (1-2-3)	
881A	3-30-40	"	Resistors (1-2-3)	
750A	8-26-39	"	Signal electric lamps (1-2; 3=750C)	
84B	4-2-35	"	Tape, friction (1-2)	
85A	8-20-35	"	" rubber (1-2)	
•1067	Nov. 1913	STAND:	Multiple vertical crank	
•1008B	M-1927	"	One-way horizontal crank – details	
•1011C	M-1934	"	" " " – assembly	
•1014C	"	"	" " pipe compensator – det. & ass'ly.	
•1066B	"	"	Single vertical crank	
3909A	12-8-38	STRAP:	Tie	

2700A	7-10-41	TAG:	Marking wires	Ⓣ
•1376B	M-1942	TANG-END:	Double	
•1017C	"	"	Lug and compensator link	
•1360B	M-1941	"	Screw jaw	
4980D	4-7-31	TARGET:	Derail	
5850E	"	"	" and connecting rods	
•1399B	M-1928	"	" low stand	
2710D	3-29-34	"	Switch and derail – details	
2715B	"	"	" " " – assemblies	
6955A	1-25-40	TERMINAL:	Wire	
•1375B	M-1935	THERMOMETER:	Storage battery	
4939A	8-10-42	TIE:	Inductor – A.T.S.	
3009A	2-2-39	"	Switch – G.R.S. Mod. 5A machine and mech'l layouts	
3019A	2-4-39	"	" – " " "	
464A	10-15-41	UNIT	Table, signal and interlocking (A.A.R. Part 203)	Ⓤ
				Ⓥ
				Ⓦ
				Ⓧ
				Ⓨ
				Ⓩ

INDUCTORS

1 Inductors must be located in accordance with N. Y. C. System Signal and Train Control Committee Drawing 9004.

(a) The following dimension limits on Drawing 9004 must be maintained.

	VERTICAL above top of rail		HORIZONTAL from gauge of rail	
	Min.	Max.	Min.	Max.
1. Where electric equipment with 3rd rail shoes is moved or operated	2-3/16″	2¼″	15⅝″	15⅞″
2. Other territory	2-7/16″	2-9/16″	17″	17½″

2 Dummy inductors shown on N. Y. C. S., S. & T. C. C. Drawing 9006 must not be used except for test inductors at engine terminals.

3 Inductor case must be kept free from gravel and ballast. Drainage must be provided so inductor coil will not be continuously subjected to moisture. Drainage holes in bottom cover plate of inductor must be kept open. Ventilator screens must be kept clean and in place.

4 Inductors, fastenings, and plates must be kept painted, and threaded parts protected against corrosion.

5 Inductor top plates must be kept tight and insulating fillers in place.

6 Inductors without winding of G. R. S. Co. or U. S. & S. Co. type should be used where signals are not arranged to display "Proceed" or "Proceed at Medium Speed."
Where inductors with windings are used the coil leads must be attached to binding posts or taped and thoroughly insulated from each other and from ground and tested as required in paragraphs 8 and 26.

CHANGE OF RAIL

7 When maintenance of way forces are changing rail, installing or replacing tie plates, removing or adzing ties, applying or removing shims or doing other work that may change the position of inductor with relation to the rail, the signal force must co-operate to insure inductors are maintained within the limits specified in paragraph 1 and that cables to inductors are not disturbed.

INDUCTOR WINDINGS

8 Values for inductor winding shall be:

(a) 1. Resistance:

	Max. Ohms	Min. Ohms
G. R. S. Co.	3.6	2.4
U. S. & S Co.	8.5	6.5

2. Impedance:

G. R. S. Co.—Min. 1250 ohms at 60 cycles.
(Max. current reading .080 amperes at 100 volts.)

3. Resonance:

U. S. & S. Co.—Capacity necessary to resonate must not exceed:
2.5 M.F. without auxiliary reactor at 100 cycles.
1.5 M.F. with auxiliary reactor at 100 cycles.

INDUCTORS TORN OUT OR REPLACED

9 When an inductor is torn out, cannot be adjusted to proper height, is improperly open circuited, or for any other reason, does not function as intended, the signal indication at that location must be arranged as follows:

(a) 1. Automatic signal must be secured to display its most restrictive indication.

2. Interlocking signal top and middle arm must be secured to display their most restrictive indication.

(b) 1. The Superintendent must be notified.

10 When an inductor is replaced, circuit must be carefully checked. Complete tests must be made as soon as practicable and results recorded on Form SC-24.

TIES

11 Ties supporting the inductor must be sawed 7″ x 9″ x 9′6″ and must be kept properly tamped against base of rail. Rails must be securely fastened to inductor ties.

GAUGES

12 Gauges shown on N. Y. C. S., S. & T. C. C. Drawing 9001 must be handled with care and frequent check made to determine that they are in proper alignment.

TOOLS AND MATERIAL

13 Tools or material must not be permitted on top of inductor or above the level of the top of the rail near the path of the engine receiver.

REPORTED FAILURES

14 When an automatic train stop brake application is reported:

(a) 1. Test and inspect for requirements in paragraphs 1, 11 and 13.

2. Test and inspect for any defects of the signal and wayside automatic train stop apparatus including inductor circuit.

3. Consult other employes for evidence to show what may have occurred to cause the improper operation.

4. If above tests and inspections do not disclose cause of automatic train stop brake application and after it has been reported as not due to failure of engine apparatus, the Signal Supervisor or other designated employe must make tests as required on Form SC-24 except impedance or resonance test.

15 When failure of forestalling whistle, bell or horn is reported:

(a) 1. Test signal circuits to determine that signal follows its relay controls.

2. Investigate the possibility that signal indication may have changed at time of reported whistle, bell or horn failure.

3. Signal Supervisor or other designated employe must make test as required on Form SC-24.

WIRES AND CABLES

16 Inductor wires and cables must be kept free from grounds, crosses and short circuits.

17 Insulation resistance between inductor winding and case, or ground, must be not less than 10,000 ohms.

18 Insulation resistance between cables or between cables and ground must be not less than 1 megohm.

19 Resistance of inductor connections including relay contacts must not exceed 2 ohms.

TESTS AND INSPECTIONS

20 Signal forces must observe passing trains, and if hopper doors are down or other objectionable conditions are noticed, must take such measures as are practicable to prevent damage to inductors. Evidence of inductors being damaged by passing equipment must be promptly reported to Superintendent and Signal Engineer.

21 Signal forces must maintain inductors in proper position, using proper inductor gauge. If adjustments are necessary they must be made only after having determined that ties are securely tamped and rails securely fastened to ties.

22 When making tests the indication displayed by the signal in the rear must not be changed in the face of an approaching train.

23 Inductors held for emergency, and inductors and connections in service must be tested annually and results recorded on Form SC-24.

24 Inductors and cables not meeting requirements of these tests must be repaired or replaced promptly.

25 Field readings must be transferred from Form SC-24 to Form SC-25. One Form SC-25 must be used for each inductor location.

CAR TEST

26 Effectiveness of inductors must be tested at least annually by car equipped with suitable testing apparatus or by other approved methods of tests. Where car method of testing is used, results shall be recorded on Form SC-26.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

INSTRUCTIONS
WAYSIDE EQUIPMENT
AUTOMATIC TRAIN STOP

N.Y. C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL. R.R.

1

ISSUE	DATE
1	11-11-1935

Approved by Representatives of Lines shown.

JC Mor

Chairman

NYCS
SC-1

RAILROAD________ DIVISION________

A Time______, ___.M. ________19___

B Train No.________ **C** Engine No.________

D Location or Signal No.________

AUTOMATIC TRAIN STOP

F ☐ Automatic stop brake application, signal at proceed.

G ☐ Failure to forestall.

H ☐ {Forestalled; whistle, bell, horn, did not sound.} Signal indicated________

K ☐ Failure of automatic train stop due to________

M ☐ Automatic stop brake application not at inductor.

O ☐ Automatic train stop cut out at________

P ☐ Broken seal.

SIGNALS

Q ☐ Indicated stop.

R ☐ Light out.

S ☐ Light dim.

U ☐ Failure of signal due to________

V Signed________
Conductor or Engineman

W Left at________, ________, ___.M.
Office, Time

Wired________, ___.M. ________19___
Time, Date

By________ To________
Operator, Train Dispatcher

Fill in, or mark 'X' for cause, sign and leave at first available point of communication. Do not use for delays due to train in block.

(Back)

Form to be used by Conductor or Engineman and Operators

(Front)

R. R. B.

SIGNAL AND AUTOMATIC TRAIN STOP REPORT

SIGNAL ENGINEER

AT________

____

DELIVER IMMEDIATELY

Operators, or others with whom this report is left, must immediately wire information to Train Dispatcher. Fill in Division and name of Railroad, address and mail card by first train mail.

FORM SC-1

100 Lb. Buff Tagboard $3\frac{9}{16}" \times 5\frac{5}{8}"$

NYCS
SC-2

SIGNAL, INTERLOCKING AND AUTOMATIC TRAIN STOP FAILURE REPORT

DIVISION________ INTERLOCKING STATION________ DATE________19___

A Time	B Train No.	C Engine No.	D Location or Signal No.	F to U Reported defect	Maintainer notified	Apparatus reported O.K.

(Code letters **A** to **U** same as report card SC-1)

AUTOMATIC TRAIN STOP

F – Automatic stop brake application, signal at proceed.
G – Failure to forestall.
H – Forestalled; whistle, bell, horn, did not sound {Signal indicated________
K – Failure of automatic train stop due to________
M – Automatic stop brake application not at inductor.
O – Automatic train stop cut out at________
P – Broken seal.

SIGNALS

Q – Indicated stop.
R – Light out.
S – Light dim.
U – Failure of signal due to________

________Dispatcher

DISPATCHER: Wire information relating to automatic train stop interruptions to Master Mechanic, Signal Supervisor and Signal Maintainer. Wire information relating to signal failures only to Signal Supervisor and Maintainer. List on this Form all failures occurring each day and mail to Signal Engineer. When these reports include A.T.S. interruptions, mail copy to Superintendent of Equipment.

________Signalman

SIGNALMAN: List on this Form all interlocking failures occurring each day and mail to Signal Engineer.

FORM SC-2

Railroad Manila $8" \times 10\frac{1}{2}"$
(Pads of 100 glued at top)

0 1 2 3
Scale of inches

NYCS
SC-3

MAINTAINERS SIGNAL AND AUTOMATIC TRAIN STOP REPORT

Headquarters________ Date________19___ Report made to________

Signal No.________ at________

Switch________ at________

A.T.S.________ at________

Reported indication displayed by signal________

Reported position of {Switch________ / Other apparatus________

Trains affected *________

Reported by________ at________, ___.M.

Report received by me________, ___.M.

While at________

Arrived at apparatus________, ___.M.

Repaired________, ___.M.

Reported O.K., to________ at________, ___.M.

Description of failure________

Cause of failure________

Action taken________

Date of last inspection________19___ ________Maintainer

*Trains affected: Report only trains that actually receive improper indications or restrictions as a result of a failure.

FORM SC-3

Railroad Manila $8" \times 10\frac{1}{2}"$
(Pads of 100 glued at top)

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

SIGNAL AND A.T.S. REPORT SC-1
SIGNAL, INT'G AND A.T.S. FAILURE REPORT SC-2
MAINT'RS SIGNAL AND A.T.S. REPORT SC-3

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

01

1	2-19-1935
2	2-19-1938
3	6-9-1941

Approved by Representatives of Lines shown.
JJ Corcoran
Ch

Plan 011A (9-30-42)
Was old plan SC-11 of
2-28-30. Forms revised,
plan renumbered.

NYCS
SC-11

RECORD OF REMOVAL AND REPLACEMENT OF D.C. APPARATUS

Location________ Section No.________ Division________ Date________19____

APPARATUS REMOVED:

Serial No.________ Type________ Kind________ Resistance________

Instruction No.________ Table No.________ No. of contacts- F____ B____ N____ R____

Circuit designation________

Remarks:________

APPARATUS INSTALLED:

Serial No.________ Type________ Kind________ Resistance________

Instruction No.________ Table No.________ No. of contacts-F____ B____ N____ R____

Circuit designation________

NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE	
DROP-AWAY				PICK-UP				PICK-UP							
Normal		Reverse		Normal		Reverse		Normal		Reverse					
Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.

NOTE: When electrical apparatus is installed, removed or replaced, record must be made on this Form.

Checked by:________ Signed:________

FORM SC-11

16 Lb. White sulphite bond 8 x $5\frac{1}{4}$
(Pads of 100 glued at top)

$1\frac{1}{2}$

5

$\frac{7}{32}$ Holes

$1\frac{1}{2}$

$\frac{7}{16}$

NYCS
SC-12

FIELD TEST RECORD OF D.C. APPARATUS

Date________19____ No.________

Location________ Section No.________ Division________ Inspector________

Circuit designation	INSTRUCTION		APPARATUS							NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE	
	No.	Table No.	Serial No.	Type	Resistance	Contacts				DROP-AWAY				PICK-UP				PICK-UP							
										Normal		Reverse		Normal		Reverse		Normal		Reverse					
						F	B	N	R	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.

FORM SC-12

16 Lb. White sulphite bond $10\frac{1}{2}$ x 8

0 1 2 3

Scale & all dimensions given in inches

NOTE: These report Forms to be used in accordance with Instruction 390.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

REM'L & REPL'T OF D.C. APPAR'S SC-11
FIELD TEST REC'D OF D.C. APPAR'S SC-12

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

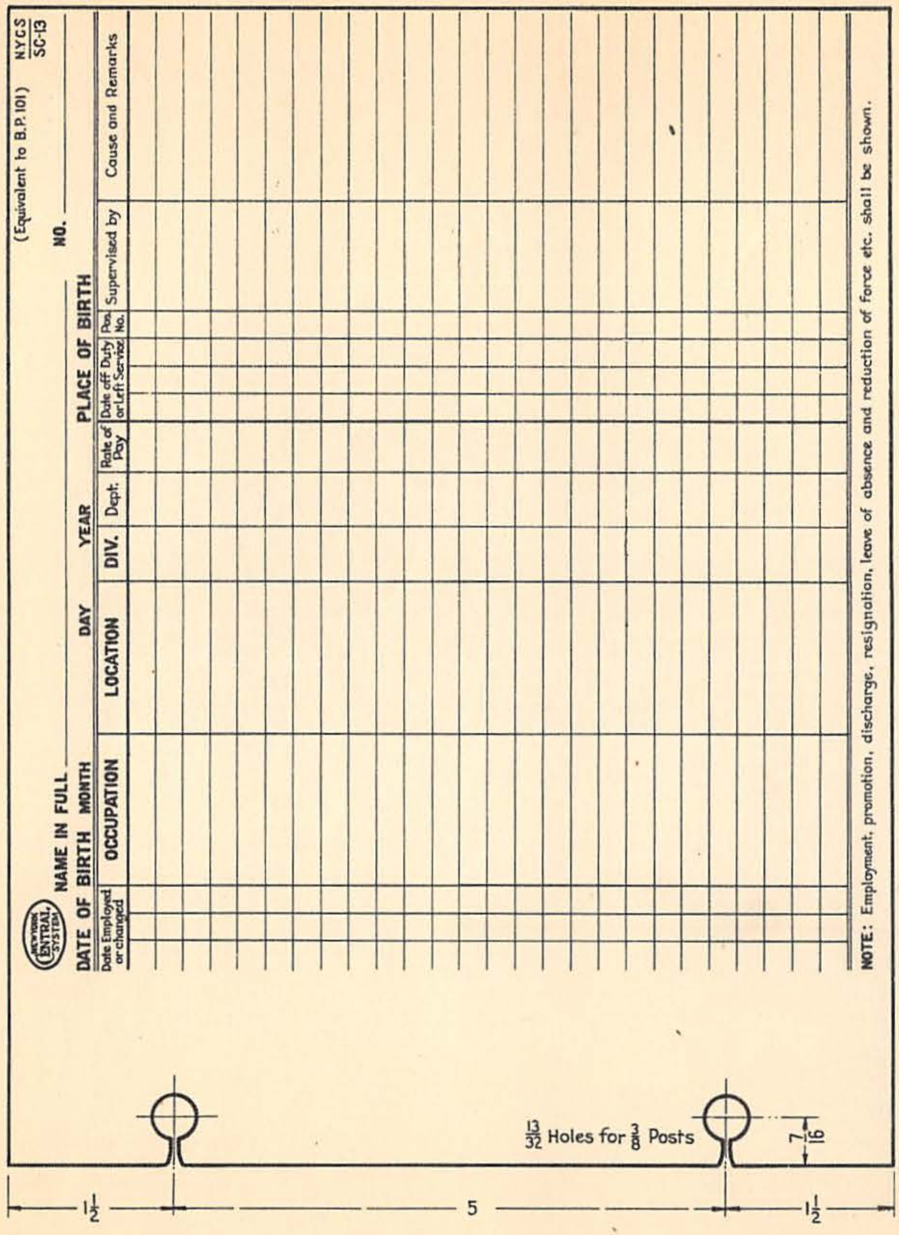
011A

9-30-1942

Approved by Representatives of Lines shown.

Chairman

013A (11-6-1946)
Plan renumbered,
was old No.13(3)of
6-21-1932: Form
SC-14 added.


NYCS
SC-13

(Equivalent to B.P. 101)

NO.

NAME IN FULL

DATE OF BIRTH MONTH DAY YEAR PLACE OF BIRTH

Date Employed or changed	OCCUPATION	LOCATION	DIV.	Dept.	Rate of Pay	Date off Duty or Left Service	Pos. No.	Supervised by	Cause and Remarks

NOTE: Employment, promotion, discharge, resignation, leave of absence and reduction of force etc. shall be shown.

FORM SC-13

{Equivalent}
{to B.P. 101.}

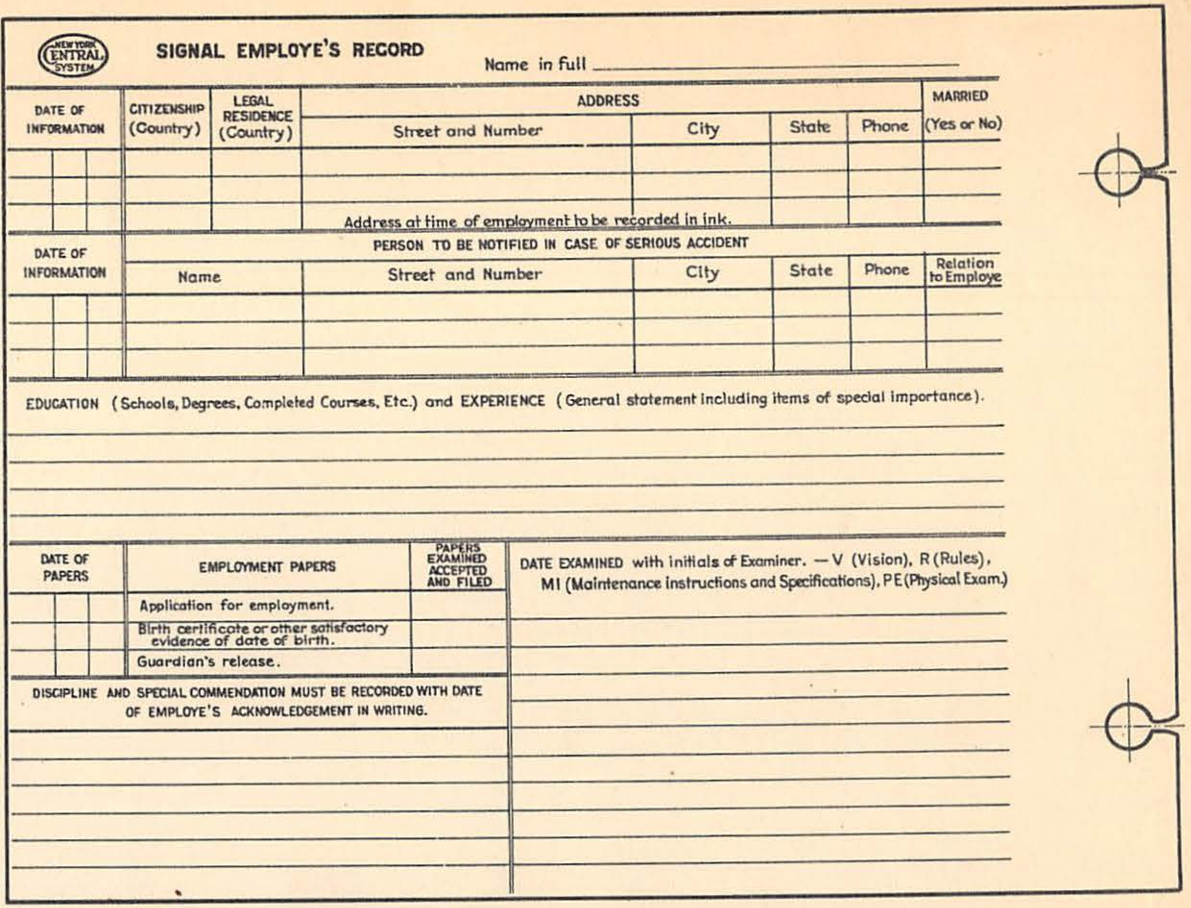
Print on Front and back as shown.

White Ledger $10\frac{1}{2}$x8

{Pads of 100}
{glued at top}

(FRONT)

(BACK)


SIGNAL EMPLOYE'S RECORD

Name in full

DATE OF INFORMATION	CITIZENSHIP (Country)	LEGAL RESIDENCE (Country)	ADDRESS				MARRIED
			Street and Number	City	State	Phone	(Yes or No)

Address at time of employment to be recorded in ink.

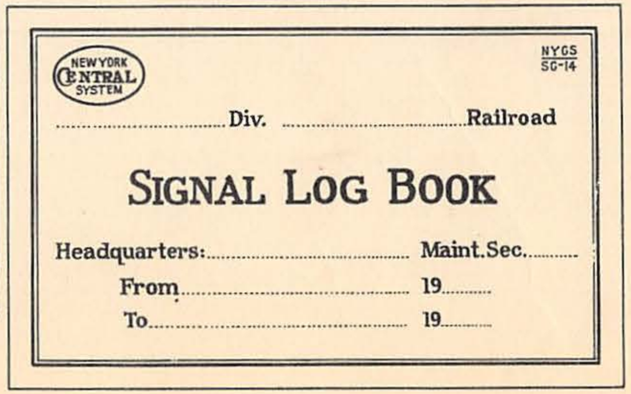
DATE OF INFORMATION	PERSON TO BE NOTIFIED IN CASE OF SERIOUS ACCIDENT					
	Name	Street and Number	City	State	Phone	Relation to Employe

EDUCATION (Schools, Degrees, Completed Courses, Etc.) and EXPERIENCE (General statement including items of special importance).

DATE OF PAPERS	EMPLOYMENT PAPERS	PAPERS EXAMINED ACCEPTED AND FILED
	Application for employment.	
	Birth certificate or other satisfactory evidence of date of birth.	
	Guardian's release.	

DISCIPLINE AND SPECIAL COMMENDATION MUST BE RECORDED WITH DATE OF EMPLOYE'S ACKNOWLEDGEMENT IN WRITING.

DATE EXAMINED with initials of Examiner. — V (Vision), R (Rules), MI (Maintenance instructions and Specifications), PE (Physical Exam.)


NYCS
SC-14

..................Div. ....Railroad

SIGNAL LOG BOOK

Headquarters:.................. Maint. Sec. ....
From.................. 19.......
To.................. 19.......

FORM SC-14

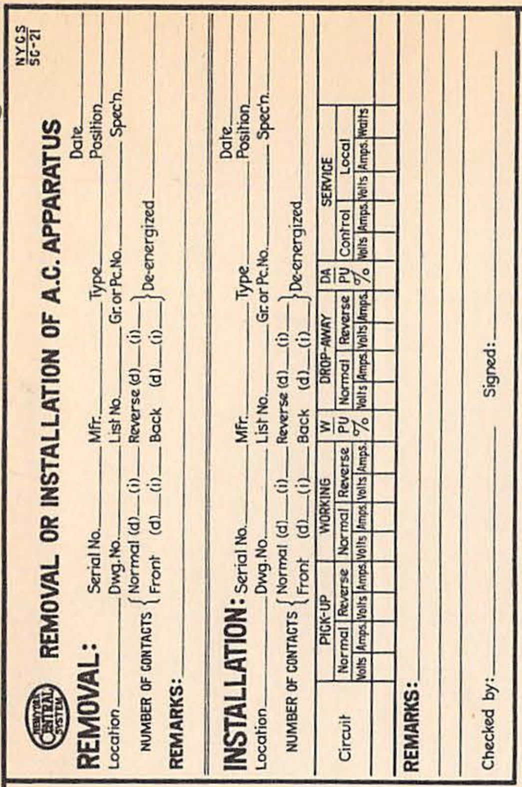
16 Lb. White gummed label
Paper 5½ x 3½

Scale and all dimensions given in inches

SIGNAL AND TRAIN CONTROL COMMITTEE	N.Y.C.R.R. M.C.R.R. C.C.C.&St.L.RY. B.&A.R.R. P.&L.E.R.R.	013A 11-6-1946
FORMS EMPLOYES RECORD SC-13 SIGNAL LOG BOOK SC-14	Approved by Representatives of Lines Shown. J. J. Corcoran Chairman	

(Printed in U.S.A.)

Plan 021 (1) 7-19-40 -
Forms SC-21 and SC-22 transferred from and cancels old plan No. SC-21 of 1-31-30. SC-23 transferred from and cancels old plan No. 3 of 6-16-31 (SC-3 removed to plan No. 01 on 2-19-35)



NYCS SC-21

REMOVAL OR INSTALLATION OF A.C. APPARATUS

REMOVAL: Location____ Serial No.____ Mfr.____ Type____ Date____
Dwg. No.____ List No.____ Gr. or Pc. No.____ Position____
NUMBER OF CONTACTS { Normal (d)__ (i)__ Reverse (d)__ (i)__ / Front (d)__ (i)__ Back (d)__ (i)__ } De-energized____ Spec'n.____

REMARKS:

INSTALLATION: Location____ Serial No.____ Mfr.____ Type____ Date____
Dwg. No.____ List No.____ Gr. or Pc. No.____ Position____
NUMBER OF CONTACTS { Normal (d)__ (i)__ Reverse (d)__ (i)__ / Front (d)__ (i)__ Back (d)__ (i)__ } De-energized____ Spec'n.____

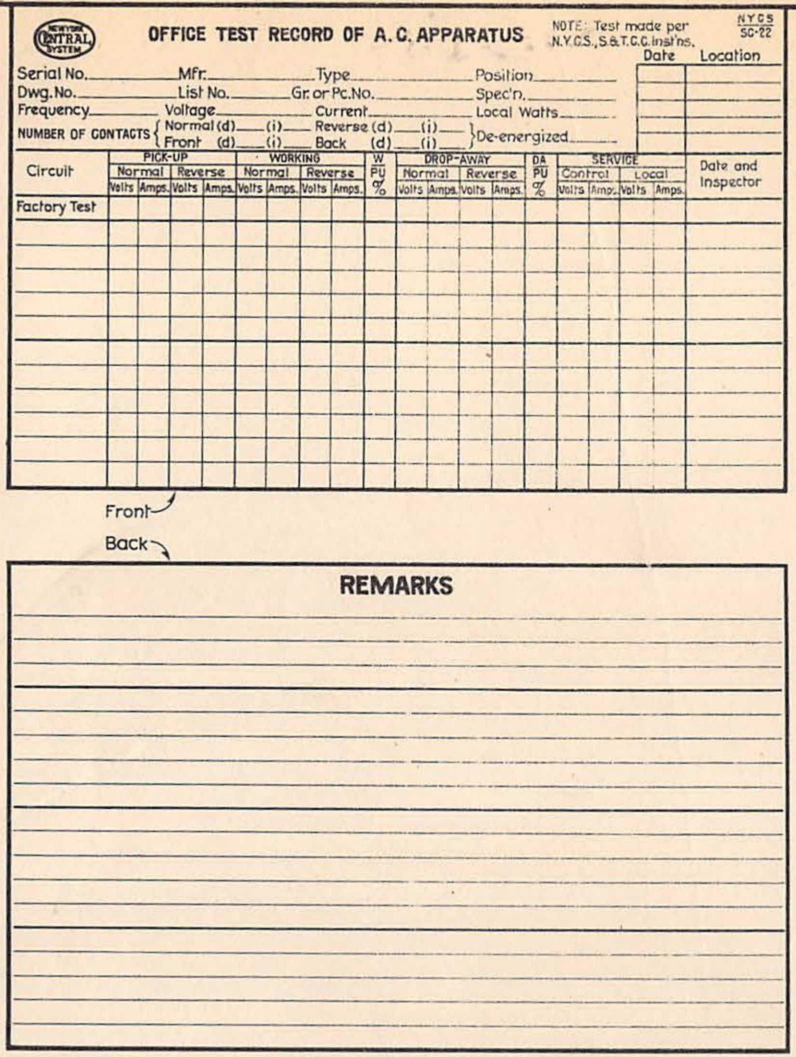
Circuit	PICK-UP				WORKING				W	DROP-AWAY				DA	SERVICE				
	Normal		Reverse		Normal		Reverse		PU	Normal		Reverse		PU	Control		Local		
	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	%	Volts	Amps.	Volts	Amps.	%	Volts	Amps.	Volts	Amps.	Watts

REMARKS:

Checked by:____ Signed:____

FORM SC-21

16 lb. White Sulphite Bond 8" x 5¼"
(Pads of 100 glued at top)



OFFICE TEST RECORD OF A.C. APPARATUS

NOTE: Test made per N.Y.C.S., S.&T.C.C. Inst'ns.

NYCS SC-22

Serial No.____ Mfr.____ Type____ Position____
Dwg. No.____ List No.____ Gr. or Pc. No.____ Spec'n.____
Frequency____ Voltage____ Current____ Local Watts____
NUMBER OF CONTACTS { Normal (d)__ (i)__ Reverse (d)__ (i)__ / Front (d)__ (i)__ Back (d)__ (i)__ } De-energized____

Date	Location

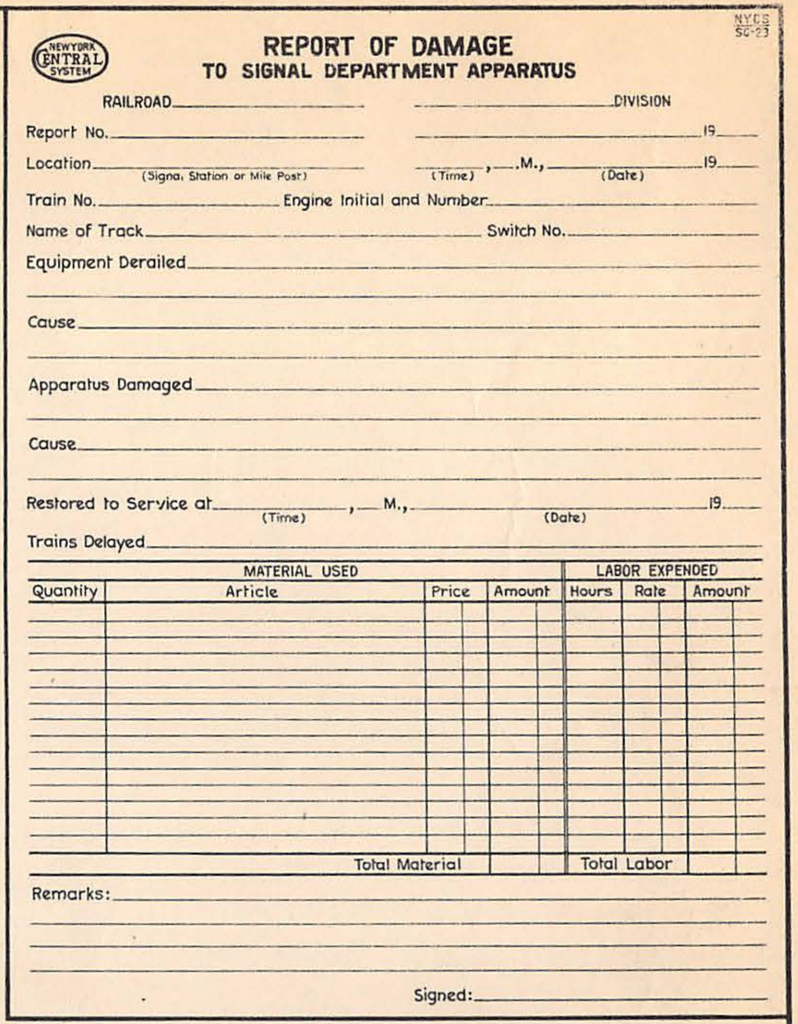
Circuit	PICK-UP				WORKING				W	DROP-AWAY				DA	SERVICE				Date and Inspector
	Normal		Reverse		Normal		Reverse		PU	Normal		Reverse		PU	Control		Local		
	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	%	Volts	Amps.	Volts	Amps.	%	Volts	Amps.	Volts	Amps.	
Factory Test																			

Front
Back

REMARKS

FORM SC-22

100 lb. White Tagboard 8" x 5"
(Print on both sides)



NYCS SC-23

REPORT OF DAMAGE
TO SIGNAL DEPARTMENT APPARATUS

RAILROAD____ ____DIVISION
Report No.____ ____19__
Location____ (Signal, Station or Mile Post) ____ (Time), __.M., ____ (Date) 19__
Train No.____ Engine Initial and Number____
Name of Track____ Switch No.____
Equipment Derailed____
Cause____
Apparatus Damaged____
Cause____
Restored to Service at____ (Time), __ M., ____ (Date) 19__
Trains Delayed____

MATERIAL USED				LABOR EXPENDED		
Quantity	Article	Price	Amount	Hours	Rate	Amount
	Total Material			Total Labor		

Remarks:____

Signed:____

FORM SC-23

Railroad Manila 8" x 10½" — (Pads of 100 glued at top)

0 1 2 3
Scale of inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

REMOVAL OR INSTAL'N OF A.C. APPAR'S SC-21
OFFICE TEST RECORD OF A.C. APPAR'S SC-22
REPORT OF DAMAGE SC-23

N.Y.C.R.R.
M.C.R.R.
C.C.C.& St.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

021
12-12-1941

Approved by Representatives of Lines shown.

J.J. Corcoran
Chairman

Plan 028A (7-15-1942)
Plan renumbered, was old plan 48 of 4-26-32
Refs. to Insths 47 made 205, Spec'n for SC-29 125 lb. Jute in lieu of Railroad Manila

5
$\frac{1}{4}$ Holes
$\frac{7}{16}$

NYCS
SC-28

NEW YORK CENTRAL SYSTEM

FIELD TEST RECORD

CROSS PROTECTION – CROSS PROTECTION RELAYS – INDICATION MAGNETS
ELECTRIC INTERLOCKING

No.________
Date________ 19___

Location________ Section No.________ Division________ Inspector________

Signal Number	Switch Number	CROSS PROTECTION TEST			RELAY TEST			INDICATION MAGNET TEST			Remarks
		VALUE AT WHICH CROSS PROTECTION IS EFFECTIVE			Factory Calibration Effective at_____	Field Test Effective at_____	Adjusted to be Effective at_____	Inst'n 205		Indication Operating Value	
		Reverse Control	Normal Control	Adjusted to be Effective at				Item No.	Resistance		
		Amperes	Amperes	Amperes	Amperes	Amperes	Amperes			Amperes	

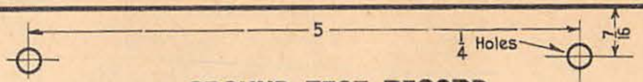
FORM SC-28

White Manifold Paper 8 x 10½

(Pads of 100 glued at top)

Scale & all dimensions given in inches

NOTE: These Forms used in connection with Instructions 205.



NYCS
SC-29

NEW YORK CENTRAL SYSTEM

GROUND TEST RECORD

Date	Location	Battery voltage	BATTERY TO GROUND		Date	Location	Battery voltage	BATTERY TO GROUND	
			Positive Amperes	Negative Amperes				Positive Amperes	Negative Amperes

FORM SC-29

125 Lb. Grade 406 Jute 8 x 10½

(Pads of 100 glued at top)

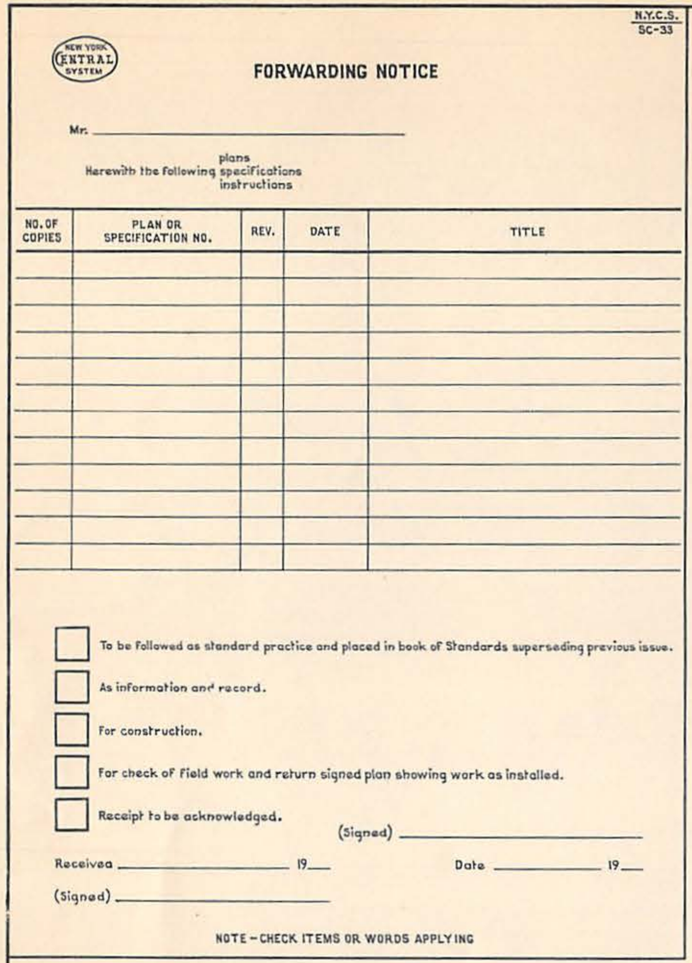
NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS
FIELD TEST RECORD SC-28
GROUND TEST RECORD SC-29

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

028A
7-15-1942

Approved by Representatives of Lines shown.
Chairman



N.Y.C.S.
SC-33

NEW YORK CENTRAL SYSTEM

FORWARDING NOTICE

Mr. ______________________________

Herewith the following plans / specifications / instructions

NO. OF COPIES	PLAN OR SPECIFICATION NO.	REV.	DATE	TITLE

☐ To be followed as standard practice and placed in book of Standards superseding previous issue.
☐ As information and record.
☐ For construction.
☐ For check of field work and return signed plan showing work as installed.
☐ Receipt to be acknowledged.

(Signed) ______________________

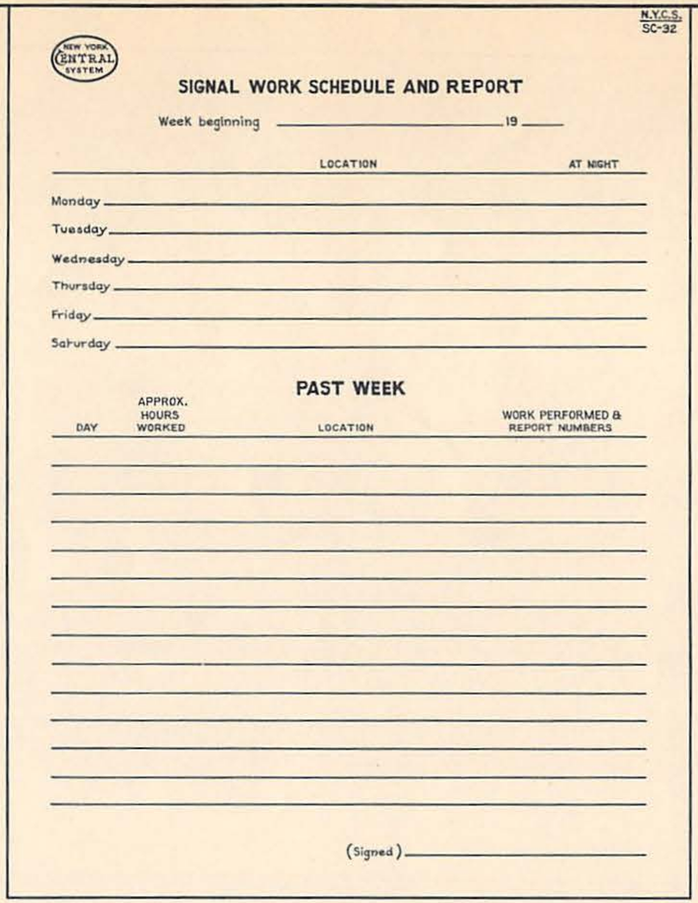
Received ______________ 19__ Date ______________ 19__

(Signed) ______________________

NOTE – CHECK ITEMS OR WORDS APPLYING

FORM SC-33

White Manifold paper 8"x10½"
Symbol 'D'
(Pads of 100 glued at top)



N.Y.C.S.
SC-32

NEW YORK CENTRAL SYSTEM

SIGNAL WORK SCHEDULE AND REPORT

Week beginning ______________________ 19____

	LOCATION	AT NIGHT
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

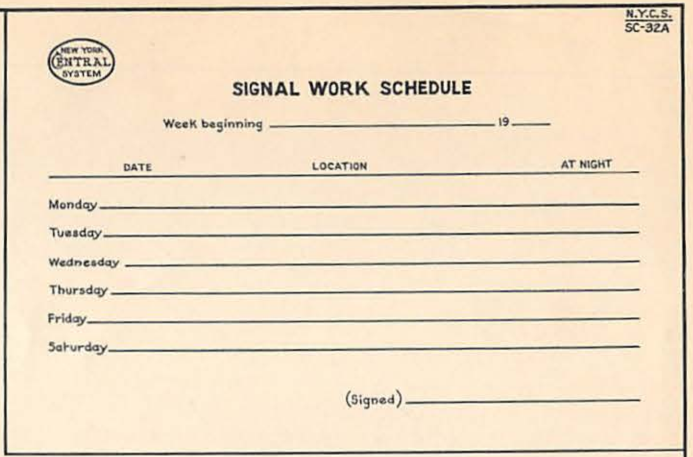
PAST WEEK

DAY	APPROX. HOURS WORKED	LOCATION	WORK PERFORMED & REPORT NUMBERS

(Signed) ______________________

FORM SC-32

Railroad Manila 8"x10½"
(Pads of 100 glued at top)



N.Y.C.S.
SC-32A

NEW YORK CENTRAL SYSTEM

SIGNAL WORK SCHEDULE

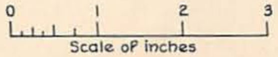
Week beginning ______________________ 19____

DATE	LOCATION	AT NIGHT
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		
Saturday		

(Signed) ______________________

FORM SC-32A

Railroad Manila 8"X 5¼"
(Pads of 100 glued at top)



NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

032C

7-25-1947
11-5-1947
8-27-1952

FORMS

SIGNAL PROGRESS REPORT SC-31
SIGNAL WORK SCHEDULE & REPORT SC-32
SIGNAL WORK SCHEDULE SC-32A

Approved by Representatives of Lines Shown
JJ Corcoran
Chairman

(Printed in U.S.A)

RECEIVED
FEB 3 1953
ORD. INTER. SECT.

NYCS
SC-35

NEW YORK CENTRAL SYSTEM

SIGNAL COUNTER READINGS

Division____________ Month of____________19____

NOTE: Counter readings are to be taken on the first working day of each month. Form with columns 1, 2 and 3 filled in to be made and forwarded on the second working day of the month to the Signal Supervisor or Signal Engineer or both as required, one Form to be retained for record.

Counter Signal Number (1)	Counter Reading Current Month (2)	Counter Reading Previous Month (3)	Movements for Current Month (4)	Multiplying Constant (5)	Total Movements (6)
Grand Total or Carried Forward					

____
Signal Maintainer

____
Signal Supervisor

FORM SC-35

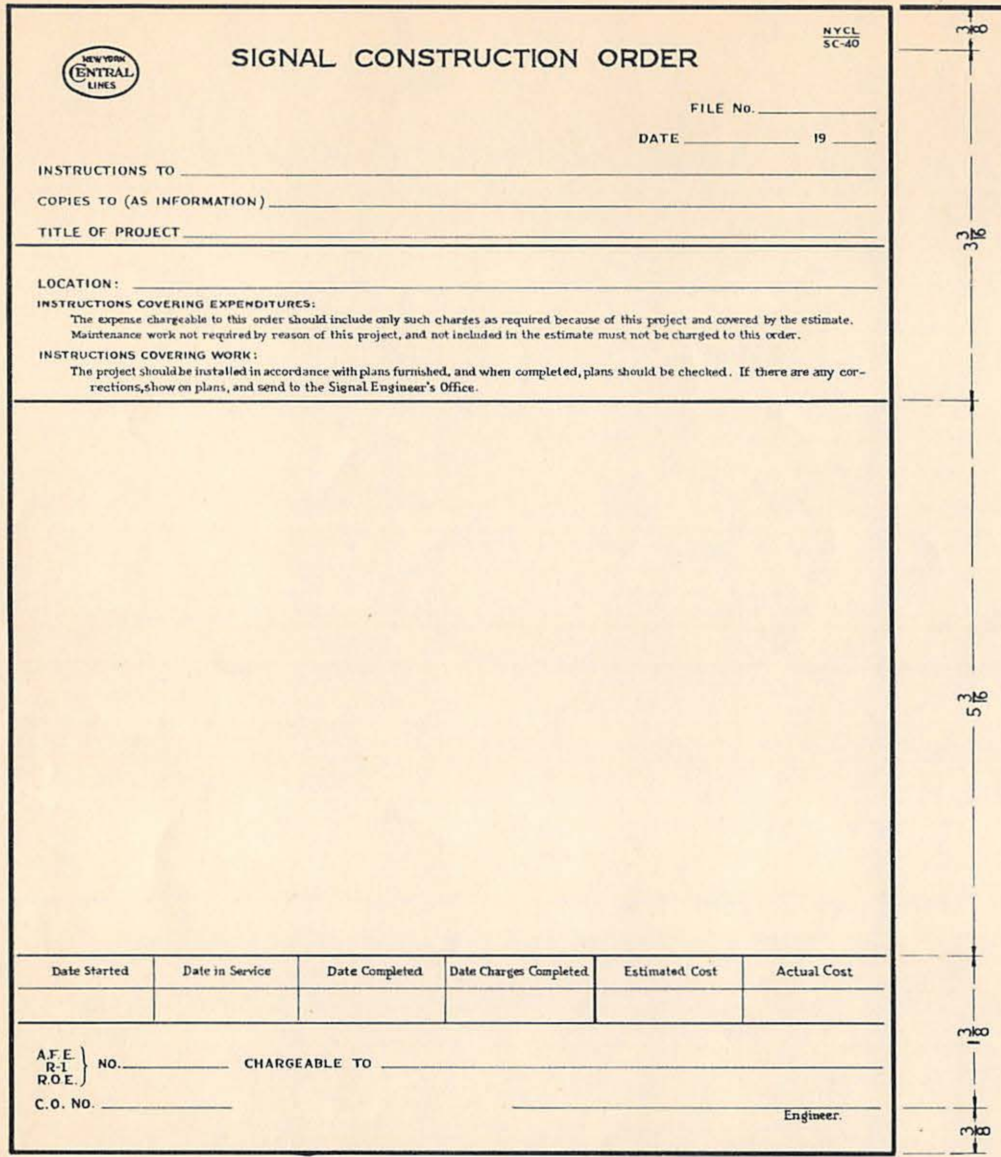
Railroad Manila $10\frac{1}{2}'' \times 8''$
(Pads of 100 glued at top)

0 1 2 3
Scale of inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&St.L.RY. B.& A.R.R. P. & L.E.R.R.	**034A** 10-6-1952
FORMS **SIGNAL COUNTER READINGS SC-35**	Approved by Representatives of Lines shown. M. Corcoran Chairman	

Printed in U.S.A.

RECEIVED
FEB 3 1953
ORD. INTER. SECT.


3/8
3 1/16
5 3/16
1 3/8
3/8

NYCL
SC-40

SIGNAL CONSTRUCTION ORDER

FILE No. ____________

DATE ____________ 19 ____

INSTRUCTIONS TO ____________

COPIES TO (AS INFORMATION) ____________

TITLE OF PROJECT ____________

LOCATION: ____________

INSTRUCTIONS COVERING EXPENDITURES:

The expense chargeable to this order should include only such charges as required because of this project and covered by the estimate. Maintenance work not required by reason of this project, and not included in the estimate must not be charged to this order.

INSTRUCTIONS COVERING WORK:

The project should be installed in accordance with plans furnished, and when completed, plans should be checked. If there are any corrections, show on plans, and send to the Signal Engineer's Office.

Date Started	Date in Service	Date Completed	Date Charges Completed	Estimated Cost	Actual Cost

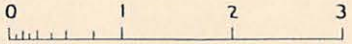
A.F.E. / R-1 / R.O.E. } NO. ____________ CHARGEABLE TO ____________

C.O. NO. ____________

____________ Engineer.

FORM SC-40

White Manifold Paper 8" x 10½"
Symbol 'D'
(Pads of 100 glued at top)



Scale and dimensions given in inches

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST. L.RY.
B.&A.R.R.
P.&L.E.R.R.

040C

7-21-1932
7-21-1934
10-6-1952

FORMS

SIGNAL CONSTRUCTION ORDER SC-40

Approved by Representatives of Lines shown.
JJCorcoran
Chairman.

Printed in U.S.A.

RECEIVED
FEB 3 1953
ORD. INTER. SECT.

NYCS
SC-42

NEW YORK CENTRAL SYSTEM

REVISED NOV. 27, 1943

SIGNAL - OUT OF SERVICE NOTICE

TO SIGNALMEN AT__________ DIVISION__________ ______19____

At__________, ____M. __________19____ The following apparatus is inoperative:

____

____

____

____

____

____

Acknowledged:__________Signalman

__________Signalman

__________Signalman

__________Signalman

Signed:__________ {Maintainer
Foreman}

1 This Form is for use at interlockings or signal stations from which signal and interlocking units are controlled.

2 Red lever blocks or red markers must be placed on levers controlling units which are inoperative or out of service. These levers must not be operated.

3 This Form must be filled out by Maintainer, in duplicate, and signed by Signalman on duty who will obtain acknowledgement of the other Signalmen. The original after being signed by Signalman shall be posted in Signal Station and one copy sent to Signal Supervisor.

4 When apparatus is made operative Signal Maintainer must sign the original notice and forward it to the Signal Supervisor.

5 This Form must not be changed after posting. Changes must be covered by a new Form.

To Signal Supervisor:
Blocks or markers have been removed from levers:__________

__________at__________, ____M. __________19____

Signed:__________ {Maintainer
Foreman}

FORM SC-42
Railroad Manila 8 x 10½
(Pads of 100 glued at top)

Printed in U.S.A.

NYCS
SC-43

NEW YORK CENTRAL SYSTEM

SIGNAL GANG WORK

DIVISION __________ FOREMAN __________ WEEK ENDING __________

LEADING SIGNAL MECHANICS __________ SIGNAL MECHANICS __________ ASST. SIGNAL MECHANICS ______

SIGNAL HELPERS __________ LABORERS __________ COOK __________

AUTHORITY NO.	NO. MEN	NO. DAYS	DESCRIPTION OF WORK DURING PAST WEEK	% COMPLETED	
				LAST REPORT	THIS WEEK
			PROPOSED WORK NEXT WEEK		
			PROPOSED WORK FOR GANGS	ESTIMATED COST	
				MATERIAL	LABOR

SIGNED:__________

FORM SC-43
Railroad M 8 x 10½
op)

0 1 2 3
Scale & all dimensions given in inche

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

UT OF SERVICE NOTICE SC-4
GANG WORK SC-4

N.Y.C.R.R. M.C.R.R. C.C.C.&St.L.RY. B.&A.R.R. P.&L.E.R.R.	042C
	7-15-1942 11-27-1943 8-20-1952

oved by Representati
ipes shown.

NYCS
SC-46

SIGNAL WIRE AND CABLE FAILURES

SECTION ____________ DIVISION ____________

APPARATUS THAT FAILED ____________ DATE OF FAILURE ________ 19 ____

1 Cable line or rubber covered wire (If cable, specify type and make-up and send in with report defective part of wire or cable). ____________

2 Exact location of wire. ____________

3 Wire in CONCRETE / WOOD Trunking; Open line COMMERCIAL / MADE-UP LINE Cable. ____________

4 Wire designation of circuit. ____________

5 Description of wire (Give gauge, kind and covering). ____________

6 Nature of defects ____________

7 Cause; Manufacturer's defects, Installation damage, Deterioration, Mechanical injury or corrosion. ____________

8 Name of Manufacturer ____________

9 Wire installed (Approx. date). ____________

10 Wire last inspected (Approx. date). ____________

11 Steps taken to prevent recurrence? ____________

12 Remarks: ____________

SIGNED: ____________ TITLE ____________

FORM SC-46

Railroad Manilla paper $8" \times 10\frac{1}{2}"$

(Pads of 50 glued at top)

NYCS
SC-47

SIGNAL INSULATION RESISTANCE TESTS

SH __ OF __

SECTION ____________ DIVISION ____________ DATE ________ 19 ____

INSTRUMENT USED ________ VOLTAGE ________ TESTED BY ____________ TITLE ____________

LOCATION	CIRCUIT DESIGNATION	INSULATION RESISTANCE	ATMOSPHERIC CONDITIONS	APPARATUS OR WIRE DEFECTIVE	MANU-FACTURER	DATE INSTALLED	REPLACEMENT OR REPAIR	CORRECTED RESISTANCE

FORM SC-47

White Manifold paper $8" \times 10\frac{1}{2}"$

(Pads of 50 glued at top)

---

0 1 2 3

Scale and dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

SIGNAL WIRE AND CABLE FAILURES SC-46
L INSULATION RESISTANCE TESTS SC-47

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.

046A

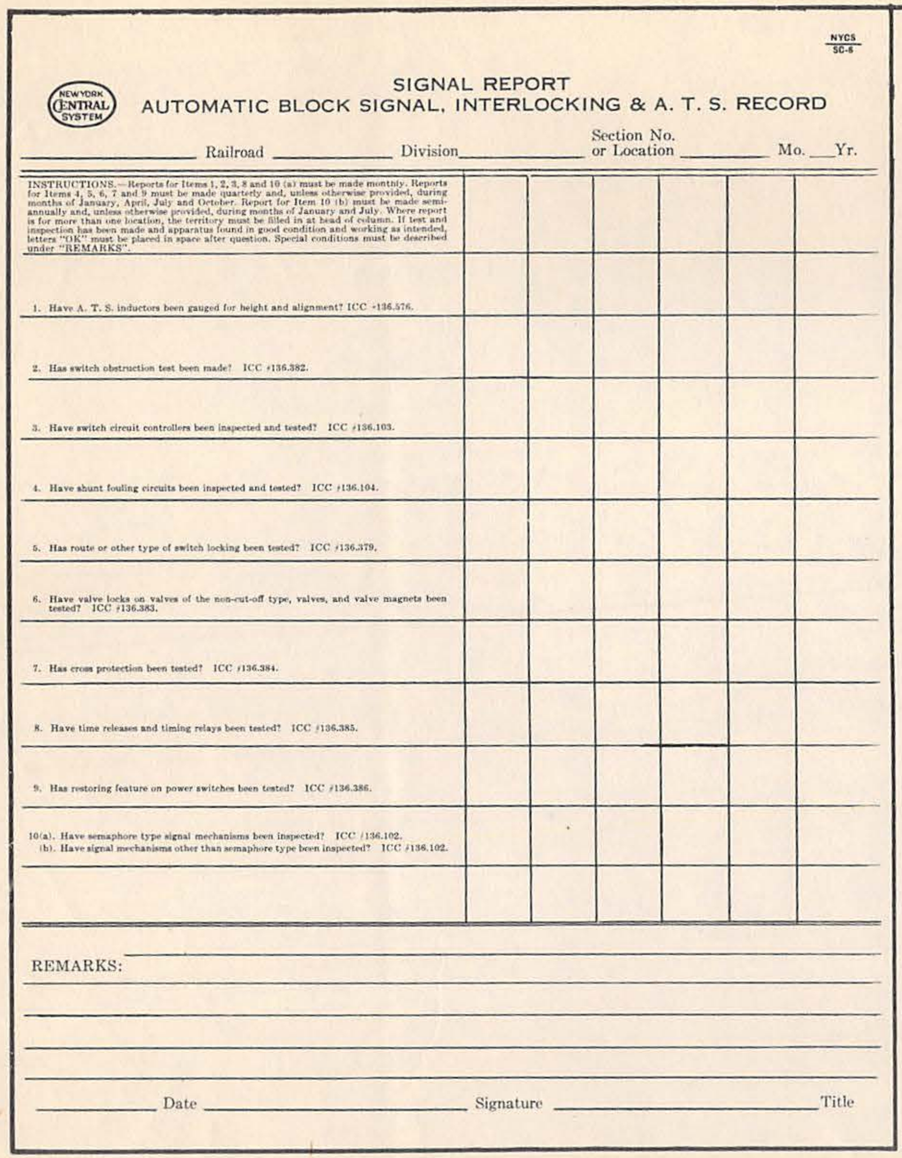
4-5-1951

Approved by Representatives of Lines shown.

Chairman

Plan No. changed from 56 to 046 A 4-5-1951.

(Printed in U.S.A.)



NYCS
SC-6

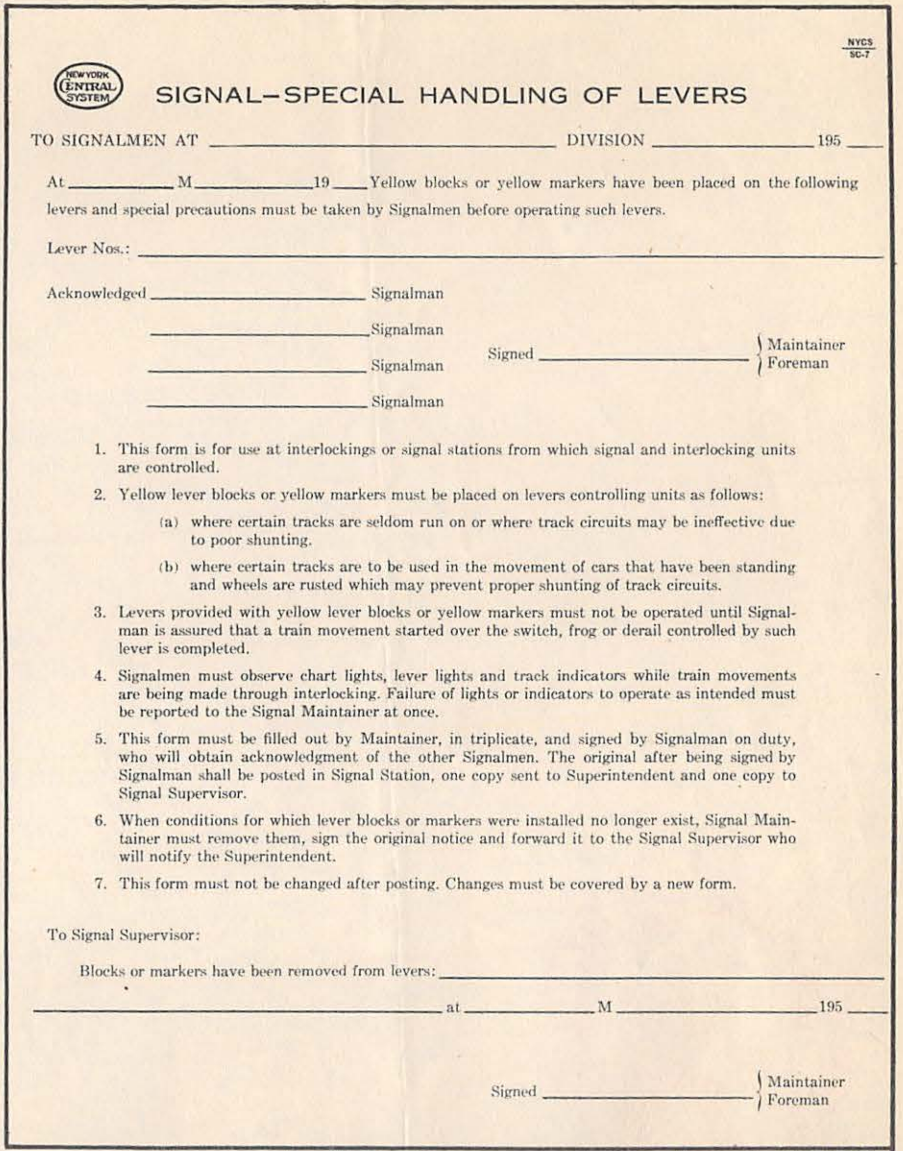
SIGNAL REPORT
AUTOMATIC BLOCK SIGNAL, INTERLOCKING & A. T. S. RECORD

__________ Railroad __________ Division__________ Section No. or Location __________ Mo. ___Yr.

INSTRUCTIONS.—Reports for Items 1, 2, 3, 8 and 10 (a) must be made monthly. Reports for Items 4, 5, 6, 7 and 9 must be made quarterly and, unless otherwise provided, during months of January, April, July and October. Report for Item 10 (b) must be made semi-annually and, unless otherwise provided, during months of January and July. Where report is for more than one location, the territory must be filled in at head of column. If test and inspection has been made and apparatus found in good condition and working as intended, letters "OK" must be placed in space after question. Special conditions must be described under "REMARKS".						
1. Have A. T. S. inductors been gauged for height and alignment? ICC #136.576.						
2. Has switch obstruction test been made? ICC #136.382.						
3. Have switch circuit controllers been inspected and tested? ICC #136.103.						
4. Have shunt fouling circuits been inspected and tested? ICC #136.104.						
5. Has route or other type of switch locking been tested? ICC #136.379.						
6. Have valve locks on valves of the non-cut-off type, valves, and valve magnets been tested? ICC #136.383.						
7. Has cross protection been tested? ICC #136.384.						
8. Have time releases and timing relays been tested? ICC #136.385.						
9. Has restoring feature on power switches been tested? ICC #136.386.						
10(a). Have semaphore type signal mechanisms been inspected? ICC #136.102. (b). Have signal mechanisms other than semaphore type been inspected? ICC #136.102.						

REMARKS: ______________________________

__________ Date __________ Signature __________ Title



NYCS
SC-7

SIGNAL—SPECIAL HANDLING OF LEVERS

TO SIGNALMEN AT __________ DIVISION __________ 195 ___

At __________ M __________ 19 ___ Yellow blocks or yellow markers have been placed on the following levers and special precautions must be taken by Signalmen before operating such levers.

Lever Nos.: ______________________________

Acknowledged __________ Signalman
__________ Signalman
__________ Signalman
__________ Signalman

Signed __________ Maintainer / Foreman

1. This form is for use at interlockings or signal stations from which signal and interlocking units are controlled.
2. Yellow lever blocks or yellow markers must be placed on levers controlling units as follows:
   - (a) where certain tracks are seldom run on or where track circuits may be ineffective due to poor shunting.
   - (b) where certain tracks are to be used in the movement of cars that have been standing and wheels are rusted which may prevent proper shunting of track circuits.
3. Levers provided with yellow lever blocks or yellow markers must not be operated until Signalman is assured that a train movement started over the switch, frog or derail controlled by such lever is completed.
4. Signalmen must observe chart lights, lever lights and track indicators while train movements are being made through interlocking. Failure of lights or indicators to operate as intended must be reported to the Signal Maintainer at once.
5. This form must be filled out by Maintainer, in triplicate, and signed by Signalman on duty, who will obtain acknowledgment of the other Signalmen. The original after being signed by Signalman shall be posted in Signal Station, one copy sent to Superintendent and one copy to Signal Supervisor.
6. When conditions for which lever blocks or markers were installed no longer exist, Signal Maintainer must remove them, sign the original notice and forward it to the Signal Supervisor who will notify the Superintendent.
7. This form must not be changed after posting. Changes must be covered by a new form.

To Signal Supervisor:

Blocks or markers have been removed from levers: ______________________________

__________ at __________ M __________ 195 ___

Signed __________ Maintainer / Foreman

FORM SC-6

Railroad Manila 8 x 10½
(Pads of 100 glued at top)

0 1 2 3
Scale & all dimensions given in inches

FORM SC-7

Railroad Manila 8 x 10½
(Pads of 100 glued at top)

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS
A.B.S., INT'G & A.T.S. RECORD SC-6
G:-SPL. HANDLING OF LEVERS SC-7

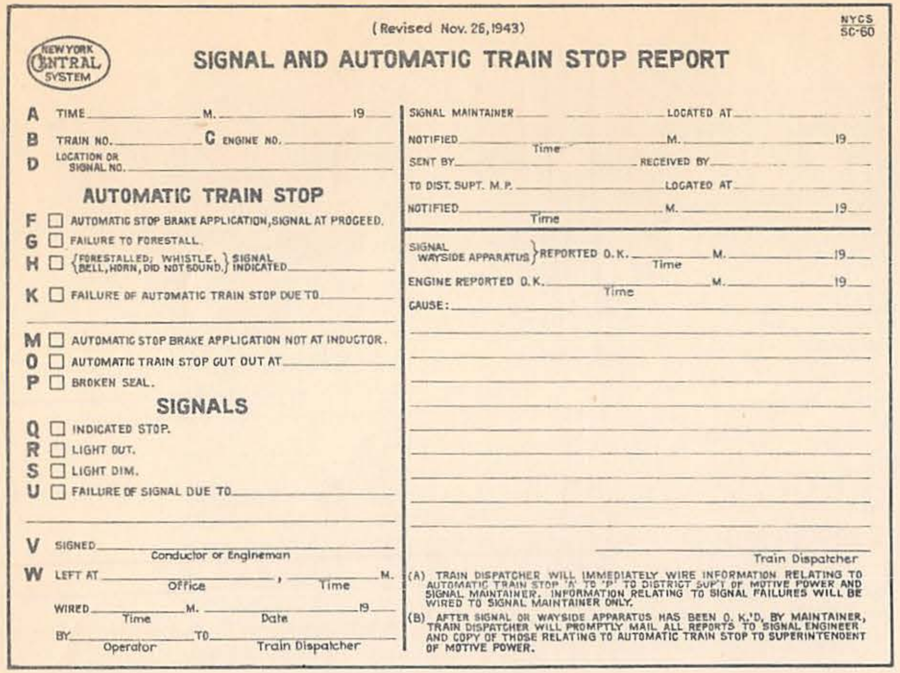
N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

06B
2-3-1943
5-23-1951

Approved by Representatives of Lines shown.
Chairman

Printed in U.S.A.

RECEIVED
NOV 8 1951
SPECIFICATION DEPT.



(Revised Nov. 26, 1943)

NYCS
SC-60

NEW YORK CENTRAL SYSTEM

SIGNAL AND AUTOMATIC TRAIN STOP REPORT

A TIME________ M. ________ 19___
B TRAIN NO.________ C ENGINE NO. ________
D LOCATION OR SIGNAL NO.________

AUTOMATIC TRAIN STOP

F ☐ AUTOMATIC STOP BRAKE APPLICATION, SIGNAL AT PROCEED.
G ☐ FAILURE TO FORESTALL.
H ☐ {FORESTALLED; WHISTLE, BELL, HORN, DID NOT SOUND.} SIGNAL INDICATED________
K ☐ FAILURE OF AUTOMATIC TRAIN STOP DUE TO________

M ☐ AUTOMATIC STOP BRAKE APPLICATION NOT AT INDUCTOR.
O ☐ AUTOMATIC TRAIN STOP CUT OUT AT________
P ☐ BROKEN SEAL.

SIGNALS

Q ☐ INDICATED STOP.
R ☐ LIGHT OUT.
S ☐ LIGHT DIM.
U ☐ FAILURE OF SIGNAL DUE TO________

V SIGNED________ Conductor or Engineman
W LEFT AT ________ Office, ________ Time M.
WIRED________ Time M. ________ Date 19___
BY________ Operator TO________ Train Dispatcher

SIGNAL MAINTAINER________ LOCATED AT________
NOTIFIED________ Time M. ________ 19___
SENT BY________ RECEIVED BY________
TO DIST. SUPT. M.P. ________ LOCATED AT________
NOTIFIED________ Time M. ________ 19___

SIGNAL WAYSIDE APPARATUS } REPORTED O.K. ________ Time M. ________ 19___
ENGINE REPORTED O.K. ________ Time M. ________ 19___
CAUSE:________

________ Train Dispatcher

(A) TRAIN DISPATCHER WILL IMMEDIATELY WIRE INFORMATION RELATING TO AUTOMATIC TRAIN STOP 'A' TO 'P' TO DISTRICT SUP'T OF MOTIVE POWER AND SIGNAL MAINTAINER. INFORMATION RELATING TO SIGNAL FAILURES WILL BE WIRED TO SIGNAL MAINTAINER ONLY.

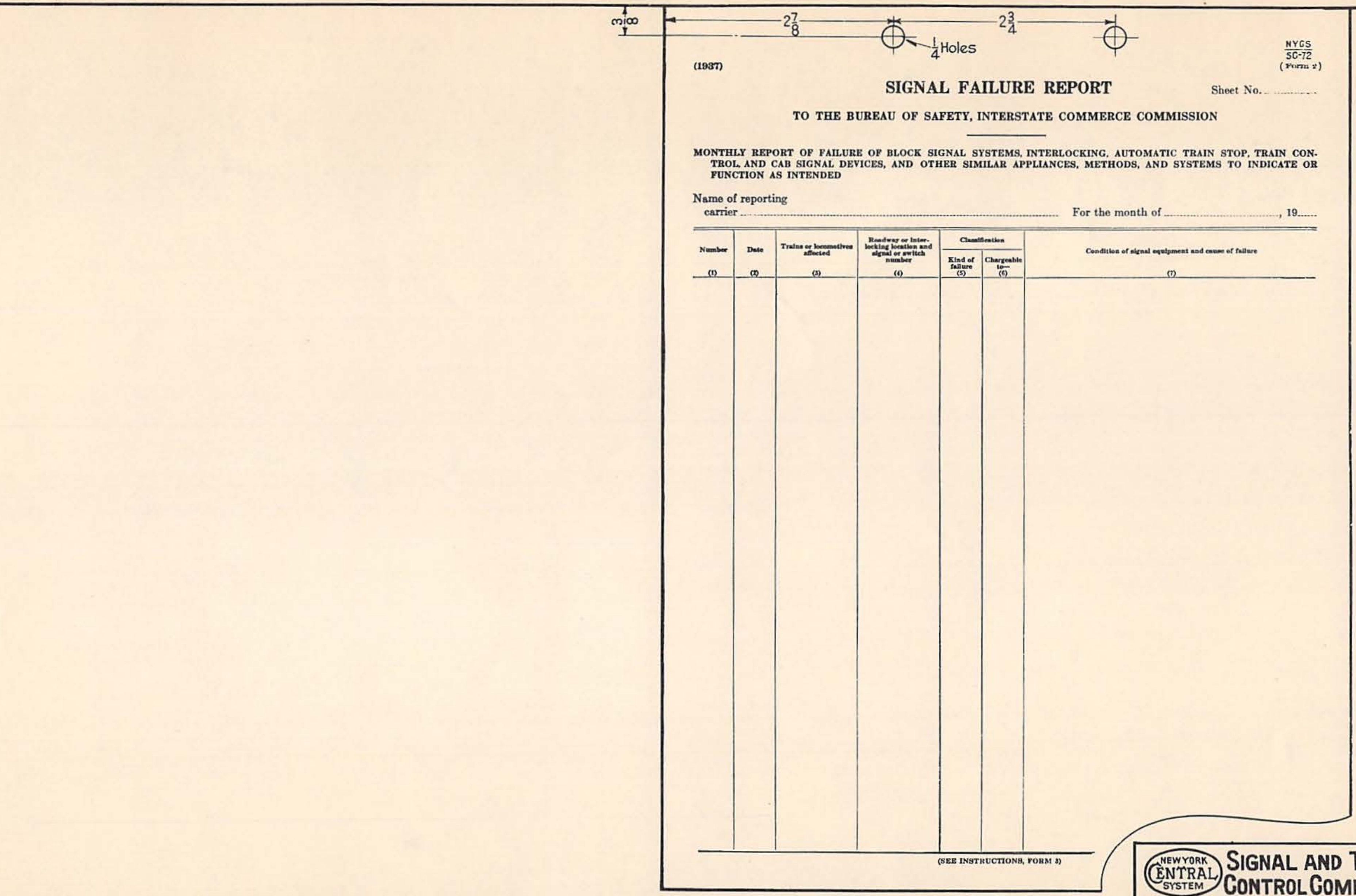
(B) AFTER SIGNAL OR WAYSIDE APPARATUS HAS BEEN O. K.'D, BY MAINTAINER, TRAIN DISPATCHER WILL PROMPTLY MAIL ALL REPORTS TO SIGNAL ENGINEER AND COPY OF THOSE RELATING TO AUTOMATIC TRAIN STOP TO SUPERINTENDENT OF MOTIVE POWER.

FORM SC-60
Railroad manila 8 x 6
(Pads of 100 glued at top)

0 1 2 3
Scale and all dimensions given in inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&ST.L.RY. B.&A.R.R. P.&L.E.R.R.	**060A** 11-26-1943
FORMS SIGNAL AND A.T.S. REPORT SC-60	Approved by Representatives of Lines shown. Chairman	

RECEIVED
MAR
2
1944
SPECIFICATION DEPT.


3/8
2 7/8
2 3/4
1/4 Holes

(1937)

NYCS
SC-72
(Form 2)

SIGNAL FAILURE REPORT

Sheet No. ....

TO THE BUREAU OF SAFETY, INTERSTATE COMMERCE COMMISSION

MONTHLY REPORT OF FAILURE OF BLOCK SIGNAL SYSTEMS, INTERLOCKING, AUTOMATIC TRAIN STOP, TRAIN CONTROL, AND CAB SIGNAL DEVICES, AND OTHER SIMILAR APPLIANCES, METHODS, AND SYSTEMS TO INDICATE OR FUNCTION AS INTENDED

Name of reporting carrier .... For the month of ...., 19.....

Number (1)	Date (2)	Trains or locomotives affected (3)	Roadway or interlocking location and signal or switch number (4)	Classification		Condition of signal equipment and cause of failure (7)
				Kind of failure (5)	Chargeable to— (6)	

(SEE INSTRUCTIONS, FORM 3)

INSTRUCTIONS

To STATIONER:
The printer must make Form 2 (SC-72) from sample of Form furnished by the Signal Engineer and not from Form on this plan as they must be exact duplicate of Form furnished by the Interstate Commerce Commission.

To SIGNAL ENGINEER:
Report sent to I. C. C. must be on Form 2 furnished by the I.C.C. and not on Form numbered SC-72.

NOTE: For compilation of reports, see Instruction 201.

0 1 2 3
Scale & all dimensions given in inches

FORM SC-72
White manifold 8 1/2 x 11
(Pads of 100 glued at top)

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS
SIGNAL FAILURE REPORT SC-72
(I.C.C. REPORT FORM)

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

071B
10-1-1942
10-8-1952

Approved by Representatives of Lines shown.
Chairman

Printed in U.S.A.

RECEIVED
FEB 8 1953
ORD. INTER. SECT.

No. SC-8 (2-28-30)
Renumbered 08
(9-23-1935).
No. 08C revision
of (7-26-43)

OFFICE TEST RECORD OF D.C. APPARATUS

NEW YORK CENTRAL SYSTEM

NYCS SC-8

Serial No.______ Type______ Kind______ Resistance______
Instruction No.______ Table No.______ No. of contacts - F___ B___ N___ R___

Date	Location

Circuit designation	NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE		Date and Inspector
	DROP-AWAY				PICK-UP				PICK-UP								
	Normal		Reverse		Normal		Reverse		Normal		Reverse						
	Volts	Amps	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	

Front **FORM SC-8** 100 Lb. White Tagboard 8 x 5 Back

REMARKS

2713

NEUTRAL ARMATURE		POLAR ARMATURE	Ser. No..........
D.A.......V.......A.	N.Wkg.......V.......A.	N.P.U.......V.......A.	OHMS..........
P.U.......V.......A.	R.Wkg.......V.......A.	R.P.U.......V.......A.	Insp. Date

RECOMMENDED
MIN. OPERATING..........V..........A.

UNION SWITCH & SIGNAL CO., PASTER $4\frac{1}{16} \times \frac{15}{16}$

2714

NEUTRAL ARMATURE		POLAR ARMATURE	Ser. No..........
D.A.......V.......A.	N.Wkg.......V.......A.	N.P.U.......V.......A.	OHMS..........
P.U.......V.......A.	R.Wkg.......V.......A.	R.P.U.......V.......A.	Insp. Date

SLOW RELEASE ORDINARY ACTING
..........SEC. AT..........V..........SEC. AT..........V.

UNION SWITCH & SIGNAL CO., PASTER $4 \times 1\frac{1}{8}$

2722

DROP-AWAY		PICK-UP		WORKING		SER. NO..........
VOLTS	AMPS.	VOLTS	AMPS.	VOLTS	AMPS.	OHMS..........
						INSP. DATE

SLOW REL. SLOW P. U. ORDINARY ACT.
..........SEC. AT.......V..........SEC. AT..........V.

UNION SWITCH & SIGNAL CO., PASTER $3 \times 1\frac{1}{16}$

51553-5 GENERAL RAILWAY SIGNAL COMPANY - ROCHESTER N.Y.

TESTED BY______ DATE______ RES.______
SER.______ D.A.______ P.U. & W.C.______
SLOW REL.______ SEC. AT______ SLOW REL.______ SEC. AT______

PASTER $3\frac{1}{4} \times \frac{3}{4}$

51553-41 GENERAL RAILWAY SIGNAL COMPANY - ROCHESTER N.Y.

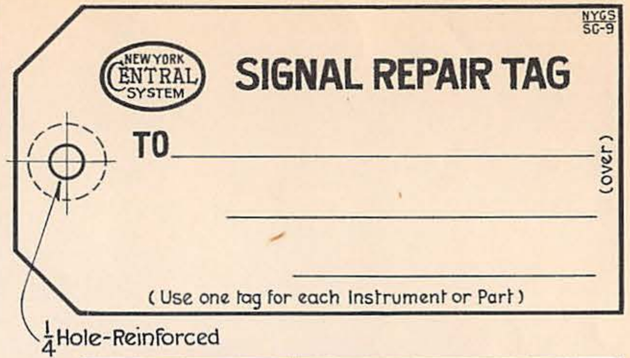
TESTED BY______ DATE______ RES.______
SER.______ D.A.______ MAX. W.C.______
MAX. POLAR W.C.______ SLOW REL.______ SEC. AT______

PASTER $3\frac{1}{4} \times \frac{3}{4}$

The above represent manufacturer's standard pasters for D. C. relays.
(Also for use in railroad shops where applicable)
Use manufacturer's ordering reference shown in upper left-hand corner.

Scale & all dimensions given in inches

NOTE: These Report Forms to be used in accordance with Instructions 390.



NYCS SC-9

NEW YORK CENTRAL SYSTEM

SIGNAL REPAIR TAG

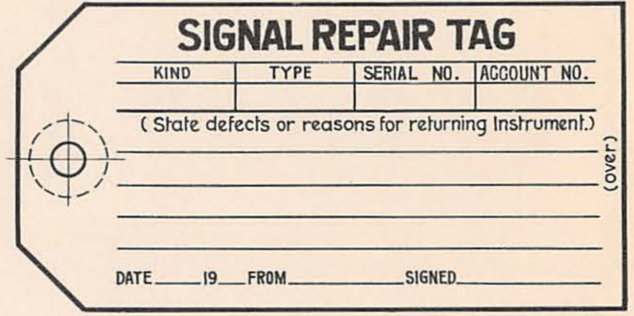
TO____________
____
____

(over)

(Use one tag for each Instrument or Part)

Front

$\frac{1}{4}$ Hole-Reinforced



SIGNAL REPAIR TAG

KIND	TYPE	SERIAL NO.	ACCOUNT NO.

(State defects or reasons for returning Instrument.)
____
____
____
____

(over)

DATE____19___ FROM______ SIGNED______

Back

FORM S C-9

150 Lb. Yellow Tagboard $4\frac{11}{16} \times 2\frac{3}{8}$

$\frac{9}{16}$

D. C. RELAY PASTER NYCS-SC-10

DROP-AWAY		PICK-UP				POLAR PICK-UP		WORKING		Time Sec.	Ser.______
		Normal		Reverse							Res.______
Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.		Date______
											Insp.______

Standard paster for use in railroad shops where manufacturer's pasters are not applicable.

FORM S C-10

16 Lb. White Sulphite Bond $4\frac{1}{2} \times \frac{3}{4}$

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FORMS

OFFICE TEST RECORD OF D.C. APP. SC-8
SIGNAL REPAIR TAG SC-9
D.C. RELAY PASTER SC-10

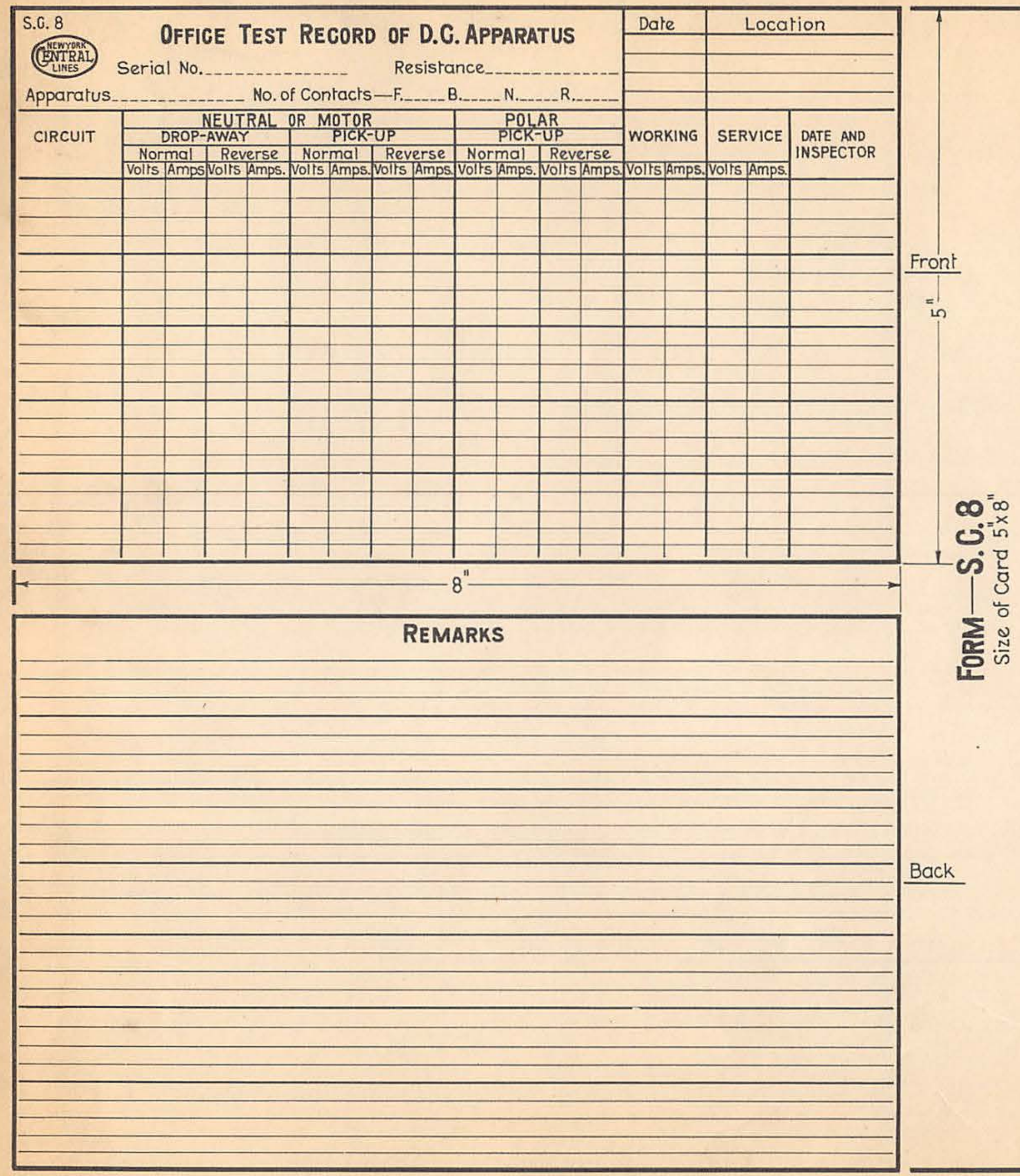
N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.& A.R.R.
P.& L.E.R.R.

08C

2-28-1930
9-23-1935
7-26-1943

Approved by Representatives of Lines Shown.

Chairman



S.C. 8

NEW YORK CENTRAL LINES

OFFICE TEST RECORD OF D.C. APPARATUS

Serial No.______________ Resistance____________

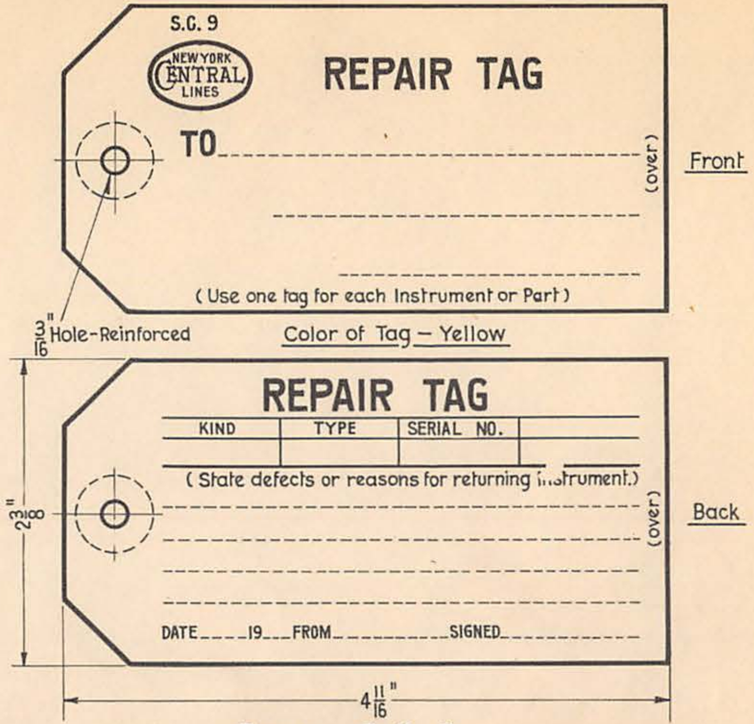
Apparatus_____________ No. of Contacts—F._____B._____N._____R._____

Date	Location

CIRCUIT	NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE		DATE AND INSPECTOR
	DROP-AWAY				PICK-UP				PICK-UP								
	Normal		Reverse		Normal		Reverse		Normal		Reverse						
	Volts	Amps	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	

REMARKS

FORM—S.C.8
Size of Card 5"x8"



S.C. 9

NEW YORK CENTRAL LINES

REPAIR TAG

TO_______________________________ (over)

____

____

(Use one tag for each Instrument or Part)

Color of Tag – Yellow

REPAIR TAG

KIND	TYPE	SERIAL NO.

(State defects or reasons for returning instrument.) (over)

____

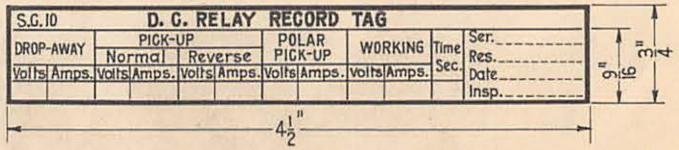
____

____

____

DATE____19___FROM__________SIGNED____________

FORM—S.C. 9



S.C.10 **D.C. RELAY RECORD TAG**

DROP-AWAY		PICK-UP				POLAR PICK-UP		WORKING		Time Sec.	Ser.__________ Res.__________ Date__________ Insp.__________
		Normal		Reverse							
Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.		

FORM—S.C. 10

Scale and dimensions given in inches

NOTE: These Report Forms to be used in accordance with Instructions No.25.

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

REPORT FORMS

FOR D.C. RELAYS AND INDICATORS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(DCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

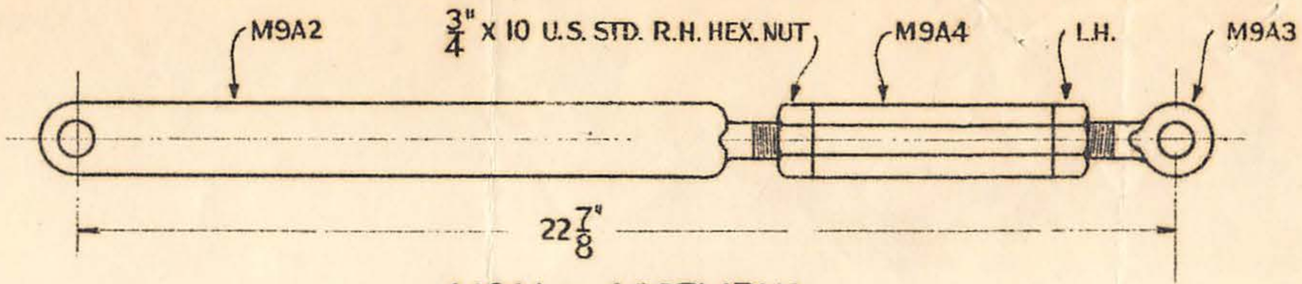
SC-8

FEB. 28 1930

Approved by Representatives of Lines Shown.

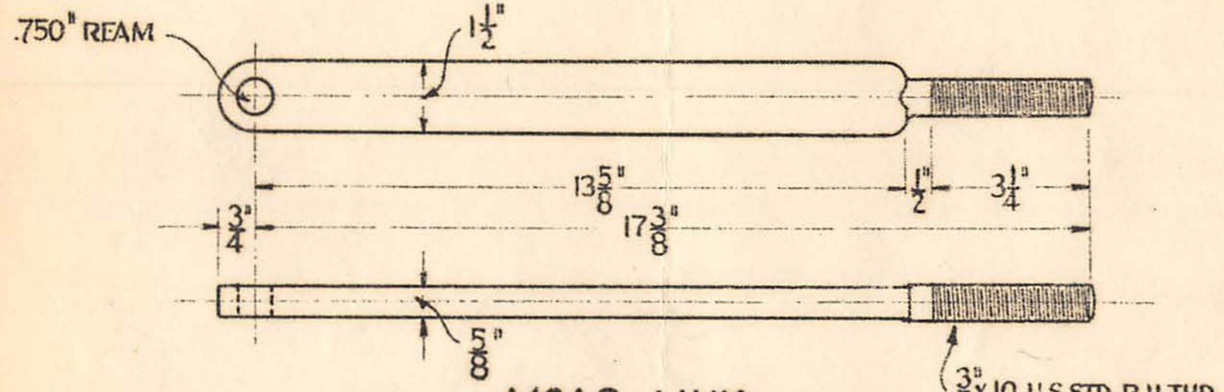
J C Mock
Chairman

WAH


M9A2
3/4" X 10 U.S. STD. R.H. HEX. NUT
M9A4
L.H.
M9A3
22 7/8"

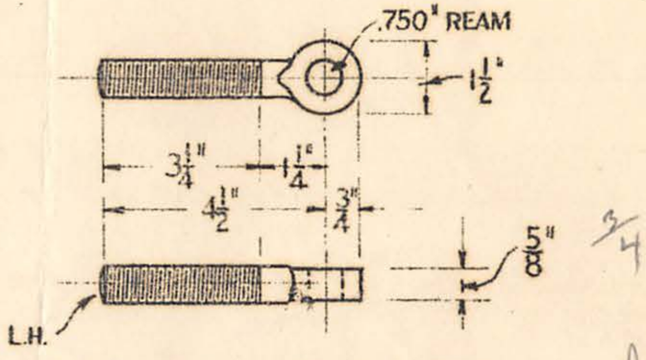
M9A1 — ASSEMBLY.

NOTE : THREAD SHALL BE WRENCH TIGHT.


.750" REAM
1 1/2"
13 5/8"
1/2"
3 1/4"
3/4"
17 3/8"
5/8"
3/4" X 10 U.S. STD. R.H. THD.

M9A2 – LINK.

O.H. STEEL


.750" REAM
1 1/2"
3 1/4"
1 1/4"
4 1/2"
3/4"
5/8"
3/4
L.H.

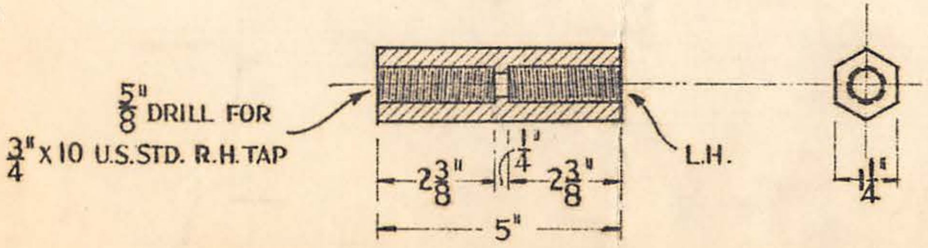
M9A3 – ADJUSTABLE EYE.

O.H. STEEL.

See misc file for cards.

MJC [illegible]

4/1/35


5/8" DRILL FOR
3/4" X 10 U.S. STD. R.H. TAP
2 3/8"
1/4"
2 3/8"
5"
L.H.
1 1/4"

G337-7

M9A4 – ADJUSTING NUT.

O.H. STEEL.

N. Y. C. R. R. | SIGNAL DEPT. | CLEVELAND, O.

TAPPET CONNECTING LINK
FOR STYLE "A" INTERLOCKING MACHINE
JULY 26, 1934

REVISION NO. | | S-M9A

SIGNAL ENGINEER.

FOR LUBRICATION OF	NAME OF LUBRICANT	ORDERING REFERENCE
1. Parts of Interlocking Machines. G.R.S.Co. Switch Machines. Switch Circuit Controllers. Time Releases.	45° Below Zero Lubricating Oil. " "	N.Y.C.Spec. 1206-Class 20. " " "
2. Signals (power)	2A Semaphore Oil.	(specialty) G.R.S.Co.
3. Air and Oil Buffers, Etc. (not equipped with Alemite fittings)	Pale Semaphore Oil.	(specialty) U.S.& S.Co.
4. U.S.& S.Co. Switch Machines: (a) Gears " "	Superla No. 18. Star Grease 'C' Splash Grease	(specialty) Standard Oil Co. (specialty) Texas Oil Co. (specialty) U.S. Graphite Co.
(b) Bearings	45° Below Zero Lubricating Oil.	N.Y.C.Spec. 1206-Class 20.
5. Parts of G.R.S.Co. Models 4A and 4B Switch Machines. Car Retarders. Switch Circuit Controllers and other Apparatus equipped with Alemite Fittings.	Alemite Semisolid Lubricant. " " " "	(specialty) Prime Mfg.Co. " " " " "
6. A.C Relays. Color Light Signal Mechanisms. Other Delicate Machinery — (shop use only).	Nye's Delicate Machinery Oil. " " "	(specialty) Wm. F. Nye, Inc. " " "
7. Leadouts, Pipe Lines. Switches and Connections. Mechanical Signals. Car Retarders (except base of mechanism).	Black Oil - Summer Grade Black Oil - Winter Grade. " " "	N.Y.C.Spec. 1206-Class 11. " " " "
8. Car Retarders (base of mechanism).	Winter Thin Alemite.	(specialty) Prime Mfg.Co.
9. Gas Engine Cylinders (water cooled).	Motor Oil. Summer. Winter.	N.Y.C.Spec. 1206-Class 4. Grade 40. Grade 20.
10. Motor Cars (mix with gas)	Motor Oil. Summer. Winter.	N.Y.C.Spec. 1206-Class 4. Grade 50. Grade 20.
11. Underground Pipes	Fuel Oil.	N.Y.C.Spec. 1370-Class 1. Must not solidify at 25°F.
12 Generators, Motors, Etc.	Refrigerator Oil.	N.Y.C.Spec. 1206-Class 19.
13. Protection against salt brine and rust.	No-Ox-Id Grease Fishoilene	(specialty) Dearborn Chem.Co (specialty) Fay Metal Patch Co.
14. Rust bound bolts and equipment.	Clarkson Penetrating Oil.	
15. Rusty rail.	Gulf Penetrating Oil.	(specialty) Gulf Refining Co.

NOTE: The above shall govern the ordering and use of lubricating oils and greases. No substitutions will be acceptable on requisitions unless authorized by Signal Engineer.

Requisitions for winter grades to be made in July for September delivery.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

LUBRICATING OILS AND GREASES

ORDERING REFERENCES
AND INSTRUCTIONS

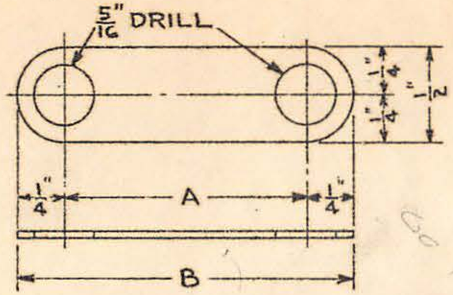
N.Y.C.R.R.
M.C.R.R.
C.C.C.&STL.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

10

ISSUE	DATE
1	4-20-1937
2	7-10-1937

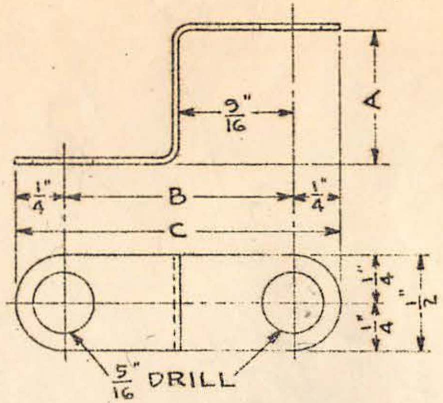
Approved by Representatives of Lines shown.
J.C. Mock
Chairman

NYC [illegible] ERE 2-2A-70 3/13/35 [illegible]
per [illegible]



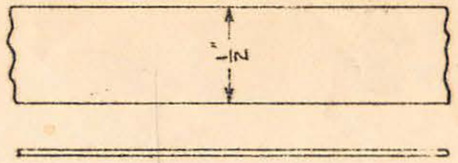
REF. NO.	A	B	WHERE USED
X10A1	1"	$1\frac{1}{2}$"	L.V. CONT. G.R.S. MODEL 5 INT. MACH. G.R.S. "K" RELAY CONTACT POSTS.
X10A2	$1\frac{1}{8}$"	$1\frac{5}{8}$"	RELAY CONTACT POSTS 410517
X10A3	$1\frac{3}{8}$"	$1\frac{7}{8}$"	TAPPET CIR. CONT. MECH. MACH.
X10A4	$1\frac{1}{4}$"	$1\frac{3}{4}$"	TERMINALS AND RESISTANCES Sim. 32736
X10A5	$1\frac{1}{2}$"	2"	TERMINALS AND RESISTANCES
			412405 dwg 412351

20.623
55.97



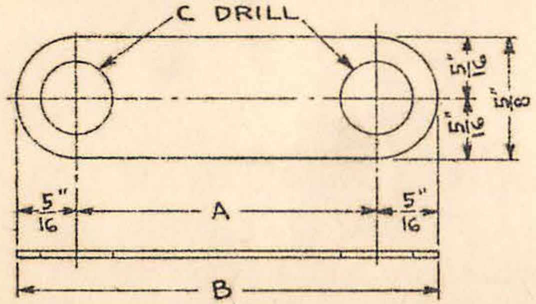
REF. NO.	A	B	C	DEVELOPED LENGTH	WHERE USED
X10A20	1"	$1\frac{1}{8}$"	$1\frac{5}{8}$"	$2\frac{5}{8}$"	G.R.S. "9E" RELAY CONTACT POSTS.
X10A21	$\frac{11}{16}$"	$1\frac{1}{8}$"	$1\frac{5}{8}$"	$2\frac{5}{16}$"	HALL-"H" RELAY CONTACT POSTS.
X10A22	$\frac{5}{8}$"	1"	$1\frac{1}{2}$"	$2\frac{1}{8}$"	G.R.S.-"K" RELAY CONTACT POSTS.

Sim 413140 20.751



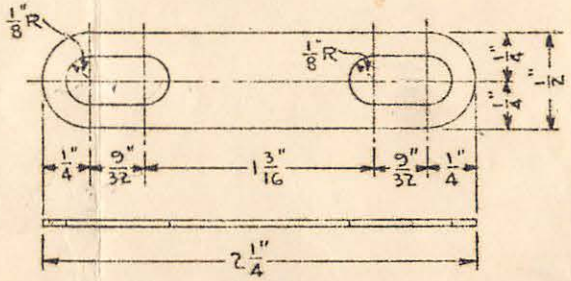
X10A28 CONNECTOR

FOR LIGHTNING ARRESTORS AND TERMINAL BUSES. LENGTH AND DRILLING TO BE DETERMINED IN THE FIELD.



REF. NO.	A	B	C	WHERE USED
X10A11	$1\frac{1}{4}$"	$1\frac{7}{8}$"	$\frac{5}{16}$"	G.R.S. MODEL 5 SW. CIR. CONT.
X10A12	$1\frac{9}{16}$"	$2\frac{3}{16}$"	$\frac{3}{8}$"	G.R.S. MODEL 7 SW. CIR. CONT.
X10A13	$1\frac{3}{8}$"	2"	$\frac{3}{8}$"	HALL SW. CIR. CONT. 410460

36.524



X10A27 CONNECTOR

FOR EVERETT TYPE RU-1 TRACK RESISTANCE

NOTE:

TERMINAL CONNECTORS SHALL BE USED WHERE REQUIRED TO CONNECT CIRCUITS IN MULTIPLE.

MATERIAL TO BE OF HALF HARD COPPER, NICKEL PLATED, NO. 18 A.W.G.

N. Y. C. R. R.	SIGNAL DEPT.	CLEVELAND, O.
TERMINAL CONNECTORS OCT. 31, 1934.		
REVISION NO.		S-X10A

SIGNAL ENGINEER

X16r

MAR 15 1935

S.C.12

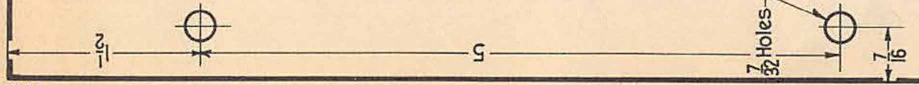
NEW YORK CENTRAL LINES

FIELD TEST RECORD OF D.C. APPARATUS

Location______ Section No.______ Division______ Date______ 19___ No.______

Inspector______

Circuit	Serial No.	APPARATUS		NO. OF CONTACTS		NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE		Remarks
						DROP-AWAY				PICK-UP				PICK-UP								
						Normal		Reverse		Normal		Reverse		Normal		Reverse						
		Type	Res.	F.	B.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	



WAH

FORM—S.C. 12
Print on paper size 8" x 10½" as shown.

S.G.11

NEW YORK CENTRAL LINES

RECORD OF REMOVAL AND REPLACEMENT OF D. C. APPARATUS

Location______ Section No.______ Division______ Date______ 19___

APPARATUS REMOVED:

Serial No.______ Type______ Resistance______ No. of Contacts — F.___ B.___ N.___ R.___

REMARKS:______

APPARATUS INSTALLED:

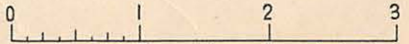
Serial No.______ Type______ Resistance______ No. of Contacts — F.___ B.___ N.___ R.___

Designation	NEUTRAL OR MOTOR								POLAR				WORKING		SERVICE	
	DROP-AWAY				PICK-UP				PICK-UP							
	Normal		Reverse		Normal		Reverse		Normal		Reverse					
	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.

NOTE:—When Electrical Apparatus is Installed, Removed or Replaced, record must be made on this Form.

CHECKED BY______ **SIGNED**______

FORM—S. G. 11
Size of Form 4" x 8" as shown.



Scale and dimensions given in inches

NOTE: These Report Forms to be used in accordance with Instructions No. 25.

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

REPORT FORMS
FOR D.C. RELAYS AND INDICATORS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P. & L.E.R.R.
RUTL.R.R.

SC-11
FEB. 28' 1930

Approved by Representatives of Lines Shown.
J.C. Mock
Chairman

INSTRUCTIONS FOR DAILY TEST OF HIGHWAY CROSSING BELLS AND SIGNALS

THE EMPLOYE DESIGNATED TO TEST CROSSING BELLS AND SIGNALS MUST MAKE TESTS AS EARLY AS PRACTICABLE EACH DAY AND KNOW THAT APPARATUS IS IN WORKING ORDER. IF BELL OR SIGNAL IS OUT OF ORDER CROSSING MUST BE PROTECTED UNTIL BELL OR SIGNAL IS RESTORED TO SERVICE.

TESTS: BELLS AND SIGNALS MUST BE TESTED BY UNLOCKING TEST BOX AND OPERATING, ONE AT A TIME, EACH PUSH BUTTON OR KNIFE SWITCH IN BOX. BELL SHOULD RING AND SIGNAL SHOULD OPERATE EACH TIME BUTTON IS PUSHED OR SWITCH IS OPENED. AFTER TESTING, BOX MUST BE RELOCKED.

RECORD OF TESTS: REPORT CARD FORM S.C.15, MUST BE KEPT IN EACH BOX CONTAINING PUSH BUTTONS OR SWITCHES. IF BELL AND SIGNAL OPERATE PROPERLY AND SIGNAL LIGHT IS DISPLAYED, MARK "OK" UNDER "CONDITION", DATE AND SIGN CARD. IF BELL OR SIGNAL DOES NOT OPERATE PROPERLY OR LIGHT IS NOT DISPLAYED, MARK "OO" UNDER "CONDITION", DATE AND SIGN CARD AND NOTIFY DISPATCHER OR SIGNAL MAINTAINER. THE EMPLOYE MAKING REPAIRS MUST SHOW THE DATE AND TIME, AND MARK 'REPAIRED' UNDER 'CONDITION' AND SIGN IN THE COLUMN 'TESTED BY', NOTIFY SUPERINTENDENT BY WIRE AND REPORT TO SIGNAL SUPERVISOR ON FORM S.C.3. MAINTAINER MUST ALSO DATE AND SIGN THE CARD WHENEVER HE MAKES INSPECTION OF THE BELL, SIGNAL OR LAMP TO DETERMINE ITS CONDITION.

FORWARDING OF CARDS: AT END OF EACH MONTH THE EMPLOYE DESIGNATED TO MAKE TEST, MUST FORWARD CARD S.C.15, TO SIGNAL SUPERVISOR AND PLACE NEW CARD IN BOX.

(FOLD HERE)

FORM S.C.15.

(NAME OF RAILROAD) **R. R. B.**

NEW YORK CENTRAL LINES

HIGHWAY CROSSING BELL AND SIGNAL REPORT

SIGNAL SUPERVISOR

....

....

7

5½

(FRONT)

STATION .... NAME AND NUMBER OF CROSSING .... MONTH .... 19......

DATE	TIME A.M.	TIME P.M.	CONDITION O.K.	CONDITION OUT OF ORDER	TESTED BY

DATE	TIME A.M.	TIME P.M.	CONDITION O.K.	CONDITION OUT OF ORDER	TESTED BY

(BACK)

FORM SC-15

NOTE—THIS FORM TO BE PRINTED ON MANILLA CARDS, SIZE 5½ X 7 INS.-FOLD.

0 1 2

SCALE OF INCHES

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

REPORT BLANK

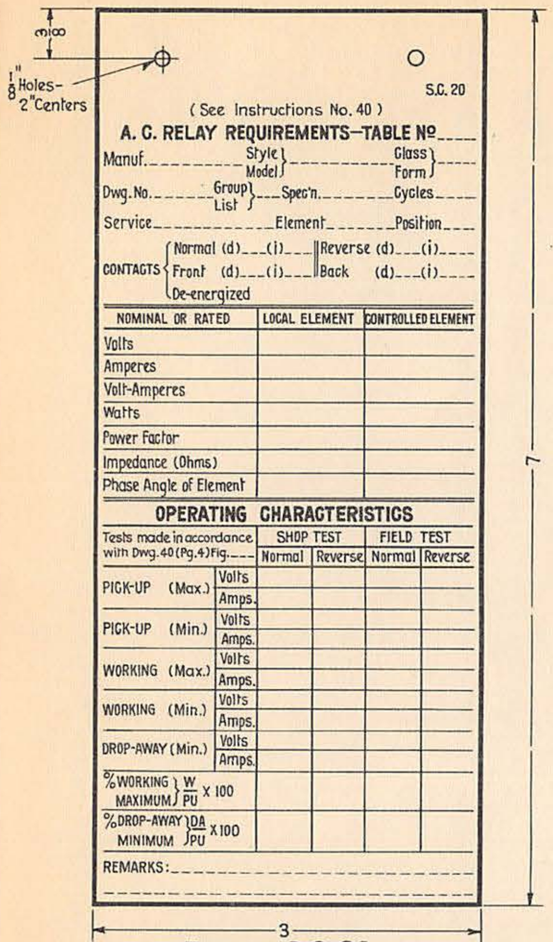
CROSSING BELL AND SIGNAL REPORT
FORM S.C.15.

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
B.&A.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
P.&L.E.R.R.
RUTLAND R.R.
N.Y.C.R.R.(OCL).

SC-15

JULY 22'1926
JULY 9' 1929

APPROVED BY REPRESENTATIVES OF LINES SHOWN.
J.C. Mock
CHAIRMAN



$\frac{3}{8}$
$\frac{1}{8}$" Holes-
2" Centers
7
3

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº____

Manuf.__________ Style/Model __________ Class/Form ____

Dwg. No.______ Group/List ___Spec'n.________Cycles____

Service_____________Element_______Position____

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)____ / Front (d)___(i)___ ‖ Back (d)___(i)____ / De-energized }

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

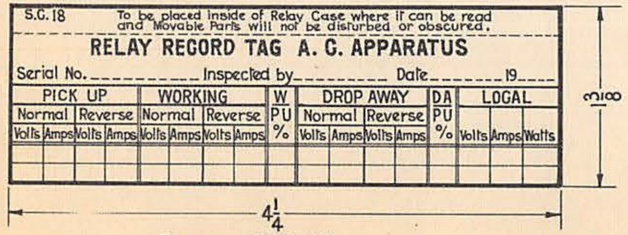
Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:________________________

____

FORM—S.C. 20

(S.C. 20 Issued in Multiples—See Page 5 of Instructions No. 40 A.C. Relays)



$\frac{3}{8}$
4$\frac{1}{4}$

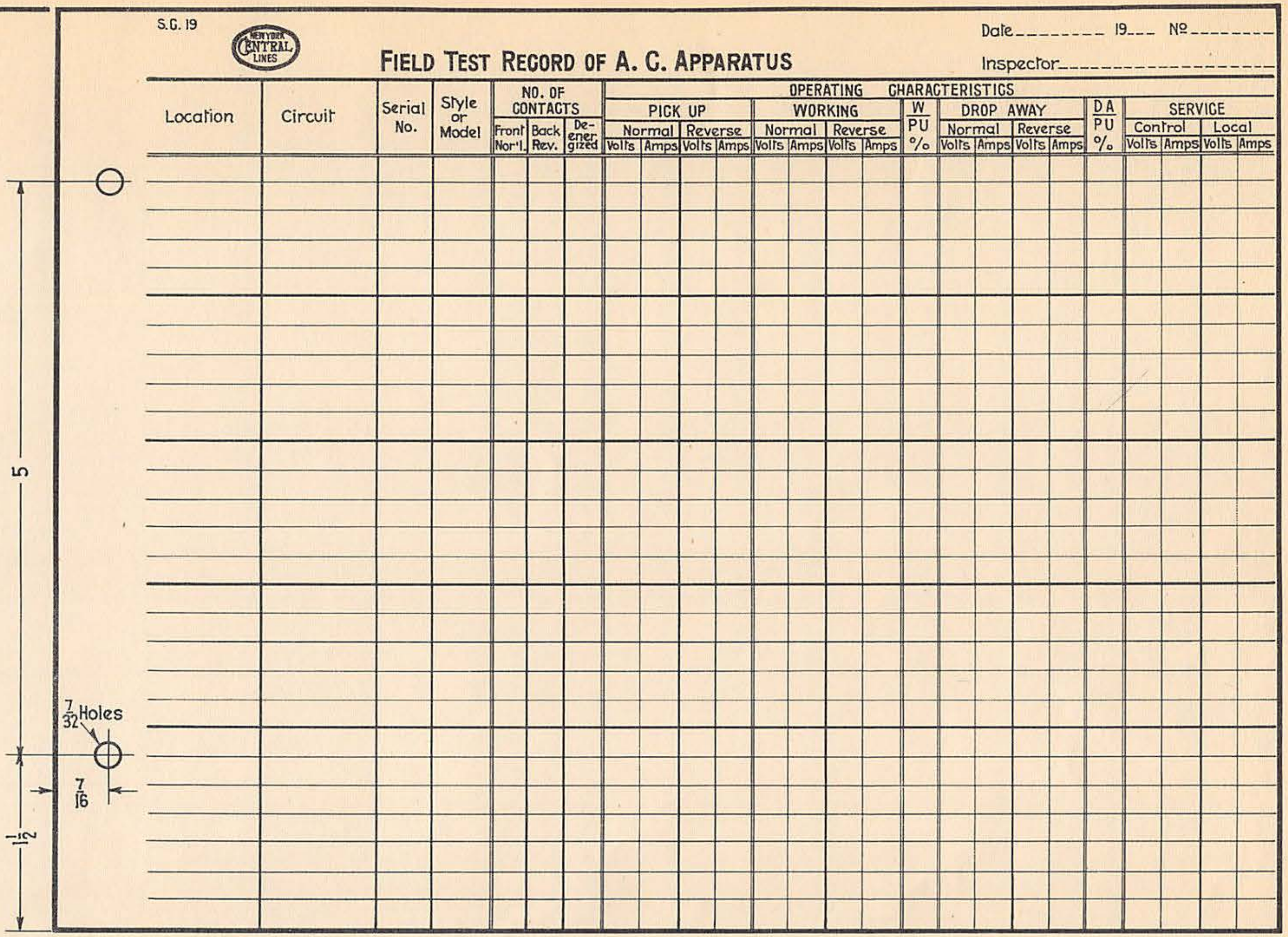
S.C. 18 To be placed inside of Relay Case where it can be read and Movable Parts will not be disturbed or obscured.

RELAY RECORD TAG A. C. APPARATUS

Serial No.___________ Inspected by__________ Date________19____

PICK UP				WORKING				$\frac{W}{PU}$	DROP AWAY				$\frac{DA}{PU}$	LOCAL		
Normal		Reverse		Normal		Reverse		%	Normal		Reverse		%			
Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps		Volts	Amps	Volts	Amps		Volts	Amps	Watts

FORM—S.C. 18



5
$\frac{1}{2}$
$\frac{7}{32}$ Holes
$\frac{7}{16}$

S.C. 19 NEW YORK CENTRAL LINES

FIELD TEST RECORD OF A. C. APPARATUS

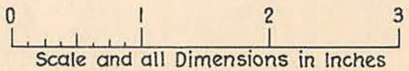
Date________ 19___ Nº________

Inspector__________________

Location	Circuit	Serial No.	Style or Model	NO. OF CONTACTS			OPERATING CHARACTERISTICS																		
							PICK UP				WORKING				$\frac{W}{PU}$	DROP AWAY				$\frac{DA}{PU}$	SERVICE			
							Normal		Reverse		Normal		Reverse			Normal		Reverse			Control		Local	
				Front Nor'l.	Back Rev.	De-energized	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps

FORM—S.C. 19

Print on Paper Size 8" x 10$\frac{1}{2}$" as Shown.



Scale and all Dimensions in Inches

NOTE: These Report Forms to be used in Accordance with Instructions No. 40

SIGNAL NEW YORK CENTRAL LINES **COMMITTEE**

REPORT FORMS

FOR A. C. RELAYS AND INDICATORS

N.Y. C.R.R. (E)
N.Y. C.R.R. (W)
N.Y. C.R.R. (OGL)
B. & A.R.R.
M.C.R.R.
C.C.C. & ST.L.RY.
P. & L.E.R.R.
RUTL.R.R.

SC-18

JAN. 31' 1930

Approved by Representatives of Lines Shown.

J C Mock
Chairman

WAH

S.C. 21

REMOVAL OR INSTALLATION OF A. C. APPARATUS

REMOVAL

Location____________ Serial No.________ Mfr.____________ Type____________ Position________
NUMBER OF CONTACTS { Normal (d)___(i)___ Reverse (d)___(i)___ De-energized_______ Date____________
{ Front (d)___(i)___ Back (d)___(i)___

REMARKS:____

INSTALLATION

Location____________ Serial No.________ Mfr.____________ Type____________ Position________
NUMBER OF CONTACTS { Normal (d)___(i)___ Reverse (d)___(i)___ De-energized_______ Date____________
{ Front (d)___(i)___ Back (d)___(i)___

Circuit	PICK UP				WORKING				W	DROP AWAY				DA	SERVICE					
	Normal		Reverse		Normal		Reverse		PU	Normal		Reverse		PU	Control		Local			
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps	Watts	

REMARKS:____
CHECKED BY________________________ **SIGNED**________________________

FORM S.C. 21
Size of Form 4"x 8"

NOTE: These Report Forms to be used in Accordance with Instructions No. 40.

S.C. 22

OFFICE TEST RECORD OF A. C. APPARATUS

Test made in accordance with { Dwg. 40-(Pg. 4) { Fig. No.______
Serial No.________ Mfr.____________ Type ____________ Position__________
Frequency________ Voltage__________ Current____________ Local Watts________
NUMBER OF CONTACTS { Normal (d)____(i)____ Reverse (d)____(i)____ De-energized________
{ Front (d)____(i)____ Back (d)____(i)____

Date	Location

Circuit	PICK UP				WORKING				W	DROP AWAY				DA	SERVICE				Date and Inspector
	Normal		Reverse		Normal		Reverse		PU	Normal		Reverse		PU	Control		Local		
	Volts	Amps	Volts	Amps	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps	%	Volts	Amps	Volts	Amps	
Factory Test																			

Front ↗
Back ↘

FORM—S.C. 22 Size of Card 5"x 8" as shown.

REMARKS

0 1 2 3
Scale of Inches

SIGNAL NEW YORK CENTRAL LINES **COMMITTEE**

REPORT FORMS
FOR A.C. RELAYS AND INDICATORS

N.Y.C.R.R.(E)
N.Y.C.R.R.(W)
N.Y.C.R.R.(OGL)
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P. & L.E.R.R.
RUTL.R.R.

SC-21
JAN. 31' 1930

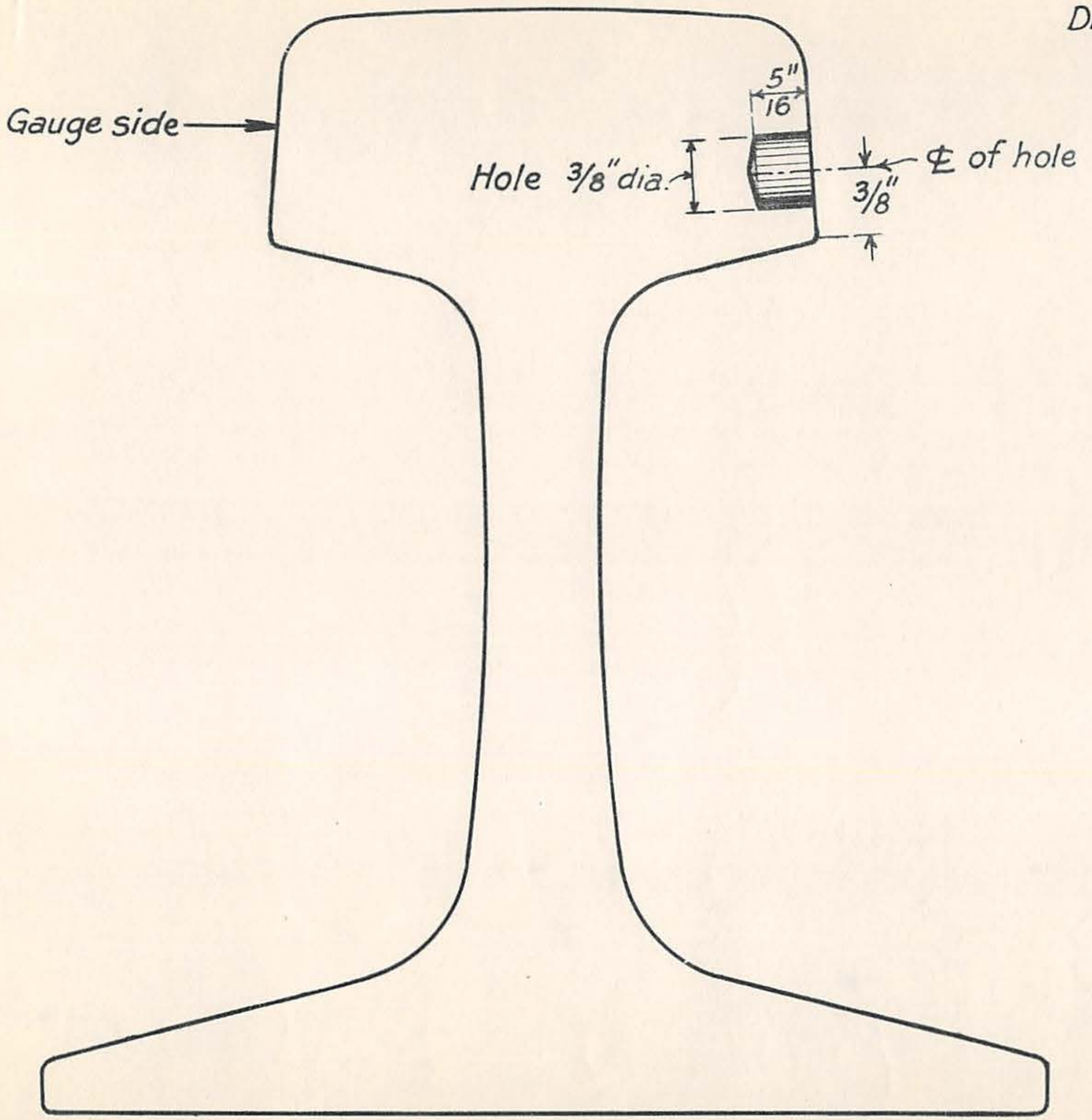
Approved by Representatives of Lines Shown.
J C Mock Chairman

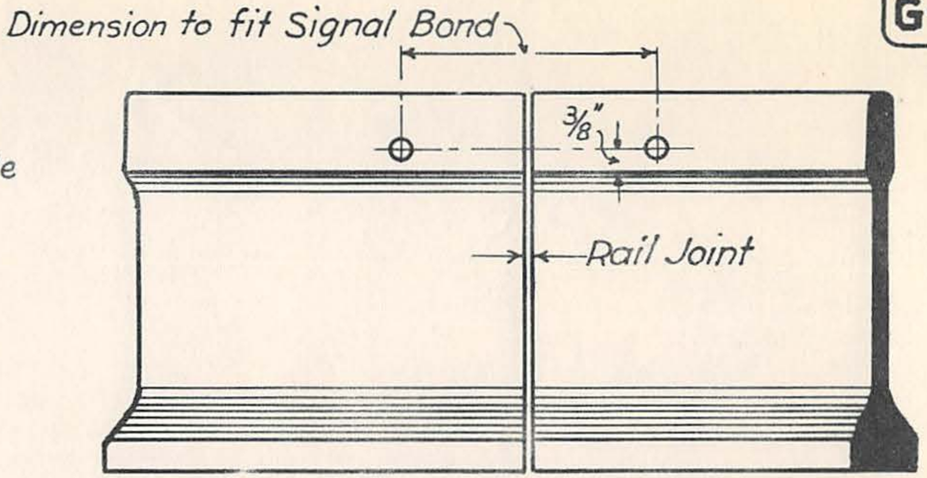
WAH

Issue	Date
1	11-11-35

EC
G-25

Recommended by:
N.Y.C. SYSTEM –
ENGINEERING –
COMMITTEE
C. B. Bronson
W. S. Burnett
H. W. Fenno
R. P. Forsberg
O. Gersbach
G. H. Harris
G. A. Kirley
R. L. Latham
L. G. Morphy
W. A. Murray
J. W. Pfau
R. O. Rote
Dr. H. von Schrenk
C. C. Warne
J. V. NEUBERT
Chairman.


Gauge side
5"/16
Hole 3/8" dia.
℄ of hole
3/8"


Dimension to fit Signal Bond
3/8"
Rail Joint

NOTE:
Dimensions shown must not be exceeded

NEW YORK CENTRAL SYSTEM
STANDARD
LOCATION OF HOLE FOR RAIL-HEAD-PLUG SIGNAL BONDS
ON ALL WEIGHTS OF RAIL

R. E. Dougherty
VICE PRESIDENT

T.C.S.

D T. 41
JAN
14
1936
C. CO.

5

7/32 Holes

7/16

NYCL
SC-27

NEW YORK CENTRAL LINES

STORAGE BATTERY RECORD

Location __________ Section No. __________ Division __________

Mfgr. __________ Type __________ Capacity ______ A.H. (8 Hr. Rate) Date installed __________ 19___

INSTRUCTIONS—Record rectifier output only when making rectifier adjustments. Record cell voltage before adjusting rectifier output. Cells shall have individual numbers.

Date	INDIVIDUAL CELL READINGS										RECTIFIER OUTPUT		Test made by	Remarks
	1	2	3	4	5	6	7	8	9	10	FOUND (Amps.)	LEFT (Amps.)		

FORM—SC-27

White card board—Size 8 x 10½
Print on both sides

5

7/32 Holes

7/16

NYCL
SG-6

NEW YORK CENTRAL LINES

MONTHLY INSPECTION REPORT
SIGNAL AND AUTOMATIC TRAIN STOP APPARATUS

	INSTRUCTIONS—The employe in charge of the maintenance of plants or territory will report monthly to Supervisor.		INTERLOCKING PLANTS AND/OR AUTOMATIC SIGNAL SECTIONS							
1	Is interlocking machine in good condition with padlock and other fastenings effective.									
2	Is mechanical locking of interlocking machine effective, clean and in good condition.									
3	Are electric lever locks effective, clean and in good condition.									
4	Is approach, route and time locking effective and operating properly.									
5	Are cotters in place and properly spread, check nuts tight, pipe couplings and rivets tight.									
6	Are switch mechanisms clean, lubricated and operating properly.									
7	Are switches, frogs and derails adjusted to required throw and points held tightly against stock rail and properly locked.									
8	Are interlocking machine and other circuit controllers clean and properly adjusted.									
9	Are signal mechanisms clean, lubricated and operating properly.									
10	Are switch circuit controllers clean and adjusted to operate when point is ¼ in. open.									
11	Are control and other circuits operating properly and in good condition; are all nuts and binding posts tight.									
12	Do track and fouling circuits shunt properly.									
13	Are lightning arresters and ground connections in good condition.									
14	Are roundels and signal lamps clean, in good condition and lights properly aligned.									
15	Is emergency equipment and material ready for service.									
16	Are automatic stop inductors and connections in good condition, in proper position and ties properly tamped.									
17	Are highway crossing signals operating properly.									
18	Are line wires clear from contact with trees, guy wires and other obstructions.									
19	What is current between high voltage operating positive and negative wires to ground.	Pos. (+)								
		Neg. (−)								
20	What is current between low voltage operating positive and negative wires to ground.	Pos. (+)								
		Neg. (−)								

21 Report conditions it is advisable to call to the attention of the Signal Supervisor. __________

Division __________ Section __________ Date __________ 19___

Checked __________ Signed __________

FORM—SC-6

Manilla paper—Size 8 x 10½

0 1 2 3
Scale and dimensions given in inches

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

REPORT FORMS
INSPECTION REPORT SC-6
STORAGE BATTERY RECORD SC-27

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(CGL).
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

6

ISSUE	DATE
1	7-22-1926
2	1-4-1932

Approved by Representatives of Lines Shown.
J.C. Mock
Chairman

WAH

DEPT. 41
MAY
2
1932
J. S. & S. CO.

F. B.

Price Dept

PURCHASE

1 Relays and indicators shall be purchased in accordance with A. R. A. Signal Section Specification, except as modified by the N. Y. C. Lines Signal Committee Instructions—*Direct Current Relays and Indicators*—Reference being made to D. C. Relay Requirement Tables 25 for the type of relay. The requisition to be worded as follows:

"..........D. C...........Relays.........Ohms
(Quantity) (Kind)

in accordance with N. Y. C. Lines Signal Committee Instructions, D. C. Relays and Indicators and Table 25, Item No.............."

2 Operating requirements shown in Tables 25 are for relays with following contacts:

Neutral Relays, 4 Front and 4 Back dependent contacts.

Polarized Relays, 4 Normal and 4 Reverse contacts on the polar armature.

3 Relays shall be equipped with shock absorbing springs of approved type.

4 Breathers shall not be required unless specified.

5 Color light signal relays shall be equipped with roundels of color specified.

5 (a) WATER LEAKS: Means must be provided to prevent water leaks through the openings of relay top.

(b) Where gaskets must be applied so as to prevent water leaks into contact enclosure, the material for gaskets must be approved by the Signal Engineer.

COILS

6 When in place coils shall be fixed to prevent vibration.

TERMINAL CONNECTIONS

7 Right hand coil terminal shall be marked "M" and used normally for positive connection and left hand terminal "L" used normally for negative connection or as specified.

BINDING POSTS

8 Binding Posts shall be designated in approved manner on relay top plate and adjacent to post or as specified. Binding posts shall be of non-corrosive metal and have minimum tensile strength of 2500 lbs.

FLEXIBLE CONDUCTORS

9 Flexible conductor connecting binding post to contact finger shall be formed and attached so as not to affect the operation of armature.

NUTS AND SCREWS

10 Nuts and screws shall be securely locked.

CONTACTS

11 Finger contacts shall meet contact surfaces squarely and simultaneously.

12 Front contact shall have a contact slide movement of not less than .010 in. against contact surfaces.

13 Metal support of the non-fusible contact element shall be not less than $\frac{1}{16}$ in. from contact surface.

14 Opening between finger contact and back contact surface, with front contact just closed, shall be not less than .020 in.

15 Front contact opening for first range voltage shall be not less than .050 in.

16 Front contact opening for second range voltage shall be not less than .090 in.

CONTACT RESISTANCE

17 Initial contact resistance with working current or voltage applied to coils shall not exceed the following:

Silver to carbon,	0.18 Ohms
Silver gauze to carbon	0.13 "
Silver to silver,	0.03 "
Carbon to carbon	0.40 "

ARMATURE END PLAY

18 Armature end play shall be not less than .010 in. and not more than .020 in.

ARMATURE MAGNETIC AIR GAP

19 The minimum magnetic air gap of neutral armature shall be insured by a hard bronze stop pin "when provided" and so positioned that when the armature is up, it shall strike against stop pin near edge opposite bearings, and midway between pole faces.

20 Neutral armatures of relays with adjustable armature fulcrums shall be equipped with 4 non-adjustable safety stop pins of phosphor bronze rigidly attached to armature near front and back edges under pole faces to insure a minimum air gap of .010 in.

21 The minimum magnetic air gap of polar armatures shall be insured by rigid stop pins of phosphor bronze.

22 The minimum working magnetic air gap of the neutral armatures having 4 contacts shall be 0.013 in. and for polar armatures 0.008 in.

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

INSTRUCTIONS
D.C. RELAYS AND INDICATORS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(DCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

25

FEB. 28'1930

Approved by Representatives of Lines Shown.
J C Mock
Chairman

(CONT'D ON PAGE 2)

CASE CLEARANCE

24 Case shall be of such size as to insure a minimum clearance of ⅛ in. between it and movable parts.

METERS

25 Shall be as specified.

26 Meters for shop use shall be calibrated bi-monthly and for field use before each cycle of test or as often as necessary.

SEALING

27 Relay case must be sealed with a seal which can be identified.

PACKING

28 Relay with less than 4 Back contacts, not provided with shipping screw, must be provided with tape or sheeting to support armature against stop pin to prevent vibration of contacts during shipment. Ends of tape or sheeting shall be attached to coil binding posts in such a way as to require its removal before wires can be connected.

29 Each relay must be placed in separate carton and suitably packed for shipment.

REPAIRING

30 Test relay for defects, giving special attention to those noted on repair tag, Form S. C. 9.

Make repairs and adjustments.

Make and record test.

SHOP TESTS

31 Relays shall be so adjusted that when tested the operating values shall conform to shop values shown in tables 25.

32 Tests as required by Form S. C. 10 must be made and recorded at time relay is tested.

33 Front and back contacts of relays must be tested for contact resistance after case is in place and before relay is sealed. Contact resistance must be in accordance with paragraph 17.

34 Insulation resistance between metal top plate and binding post shall measure infinity when measured with 500 volt megger.

METHOD OF TESTING RELAYS

35 (a) NEUTRAL ARMATURE:

(1) With connections as noted in paragraph 7, apply initial charge as shown in Tables 25 for 20 seconds.

(2) Drop-away:

Gradually reduce initial charge until front contacts open.

(3) Normal Pick-up:

Open circuit, then apply energy in same direction and gradually increase until front contacts just close.

(4) Normal working:

Continue to gradually increase energy until armature strikes stop pin or pins.

(5) Reverse Pick-up:

Apply initial charge as in 1, gradually reduce energy to zero, reverse polarity, then gradually increase energy until front contacts just close.

(6) Reverse working:

Continue to gradually increase energy until armature strikes stop pin or pins.

(b) POLARIZED ARMATURE:

(1) Pick-up:

Apply initial charge as in (a)-(1), then gradually reduce energy to zero, reverse polarity and gradually increase energy until contacts just close in opposite position.

(2) Working:

Continue to gradually increase energy until polarized armature strikes stop pin or pins.

(3) Polarized armature pick-up and working values must be determined as in (b)-(1) and (2) for each direction, reversing initial charge. Record maximum values.

(c) COLOR LIGHT SIGNAL RELAYS:

(1) When making pick-up and drop-away tests for 3-position operation, field coils shall be energized in accordance with Tables 25.

(2) Pick-up is obtained by increasing current through armature until no color other than yellow or green is shown.

(3) Release is obtained by decreasing current through armature until no color other than red or purple is shown.

(CONT'D ON PAGE 3)

(4) Pick up and drop-away tests must also be made with relay tilted to just take up end play in each direction to determine whether there is excess friction and the values so obtained must closely check with those taken with relay in normal position.

(5) For 3-position operation the pick-up and release values shall not vary from each other more than .2 volts.

(6) With relays de-energized, it shall be carefully tipped and rocked in different positions to determine that no undue friction is present in the relay.

(d) MOTOR RELAYS:

(1) Normal or reverse pick-up:

Apply energy in direction desired and gradually increase until contacts just close.

(2) Normal or reverse working:

Continue to gradually increase energy until armature strikes stop.

(3) Drop-away:

Gradually reduce working energy until contacts assume center or de-energized position.

SHOP INSPECTION

36 Determine by actual operation that relay has a positive drop-away and relay contacts open without retardation of movement due to friction or external force.

37 Before case is placed, determine that each part to be enclosed is free from foreign matter, in proper position and in good condition.

FIELD TESTS

38 Tests as required by paragraph 35 and Form S. C. 12 must be made annually.

39 For pick-up and drop-away test, remove only positive wire from binding post of relay before commencing test to insure that test current flows through relay in same direction as normal service current, and complete test as required by paragraph 35.

FIELD INSPECTION

40 It must be determined by observation that sufficient front and back contact opening exists, that back contacts do not open due to vibration of train passing or other causes.

41 Relays not meeting field requirements must be taken out of service.

42 Relays shall meet shop requirements when placed in service, except in emergency when relays meeting field requirements may be used.

43 Determine by observing operation of relay that sufficient clearance exists between case and movable parts.

44 Parts enclosed shall be free from foreign matter, in proper position and in good condition.

45 Emergency repairs and adjustments to insure proper operation of relay, for temporary use, may be made in the field.

RECORDING

46 Office relay records must be filed in groups, indexed according to location, in order of mileage direction.

47 Relay records of an interlocking must be filed under index card for that location.

48 Relay records of automatic signal territory must be indexed for the territory between points designated.

49 Relay shall be identified by serial nunber which shall be recorded. Manufacturer's serial number must be used if available.

50 Inspectors must re-mark indistinct serial numbers.

51 Relays that have illegible or no serial number shall be assigned serial number. The serial number shall be preceded by a letter which shall be assigned by the Signal Engineer.

52 Inspectors must immediately record field readings on Form S. C. 12, which, when filled, must be forwarded to office designated by Signal Engineer.

53 Field readings must be transferred from Form S. C. 12 to Form S. C. 8. One Form S. C. 8 must be used for each relay or electrical instrument.

(CONT'D ON PAGE 4)

G.R.S.Co. TYPE 'K' — U.S.&S.Co. TYPE 'DN-11' **NEUTRAL RELAYS** OR APPROVED RELAYS OF OTHER MANUFACTURE

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT								FIELD REQUIREMENT					REMARKS
					MIN'M DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAXIMUM PICK-UP AND WORKING				MINIMUM DROP-AWAY		MAXIMUM NORMAL PICK-UP AND WORKING		MAXIMUM SHUNT RELEASE	
									Normal		Reverse							
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Sec.	
1	1 ST.	2	.84	.42	.042	.021	.106	.053	.21	.105	.262	.131	.072	.036	.23	.115	1.85	
2	"	4	1.12	.28	.06	.015	.148	.037	.28	.07	.35	.0875	.1	.025	.308	.077	1.85	
3	"	16	2.24	.14	.128	.008	.288	.018	.56	.035	.704	.044	.192	.012	.624	.039	1.85	
4	"	100	7.6	.076	.30	.003	.7	.007	1.9	.019	2.4	.024	.47	.0047	2.1	.021		
5	"	500	9.	.018	1.35	.0027	3.3	.0066	6.3	.0126	7.85	.0157	2.25	.0045	7.	.014		
6	"	670	10.	.015	.805	.0012	1.94	.0029	5.36	.008	6.	.009	1.34	.002	6.	.009		
7	"	1000	10.	.01	1.	.001	2.5	.0025	6.	.006	7.5	.0075	1.7	.0017	7.	.007		
8																		
9																		
10																		
11																		
12																		
QUICK SHUNT NEUTRAL RELAYS																		
13	1 ST.	4_3	2.1	.3	.126	.018	.301	.043	.595	.085	.742	.106	.245	.035	.658	.094	.6	
14	"	4	1.2	.3	.072	.018	.172	.043	.340	.085	.424	.106	.140	.035	.376	.094	.9	
15																		
16																		
17																		
Sub-figure equals external resistance. Time of shunt circuit release is when current through relay is adjusted to 100% over actual working current battery voltage, 1.5 Volts and .06 Ohms shunt resistance across relay and Sub-figure resistance.																		
SWITCH INDICATORS																		
18	1 ST.	500	9.	.018	2.5	.005									7.5	.015		
19	"	670	9.	.0134	2.48	.0037									8.	.012		
20	"	1000	10.	.01	2.5	.0025									8.	.008		
21																		
22																		
23																		
TOWER INDICATORS																		
24	1 ST.	500	10.	.020			1.8	.0036	5.5	.011			1.	.002	6.	.012		
25	"	1000	10.	.010			2.2	.0022	8.	.008			1.5	.0015	6.8	.0088		
26																		
27																		

D.C. RELAY REQUIREMENT TABLE

NEW YORK CENTRAL LINES
SIGNAL COMMITTEE
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D.C. RELAYS AND INDICATORS

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OTHER TYPES——NEUTRAL RELAYS

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT								SHOP & FIELD		FIELD REQUIREMENT				REMARKS
					MIN. DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAXIMUM PICK-UP				MAXIMUM NORMAL WORKING		MINIMUM DROP-AWAY		MAXIMUM NORMAL PICK-UP		
									Normal		Reverse								
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	
28	I ST.	2	.9	.452	.042	.021	.094	.047	.226	.113	.282	.141	.346	.173	.07	.035	.248	.124	
29	"	4	1.25	.312	.06	.015	.148	.037	.312	.078	.392	.098	.48	.12	.088	.022	.344	.086	
30	"	5	1.42	.284	.07	.014	.17	.034	.355	.071	.445	.089	.545	.109	.1	.02	.39	.078	
31	"	7	1.68	.24	.077	.011	.189	.027	.42	.06	.525	.075	.637	.091	.112	.016	.46	.066	
32	"	9	2.09	.232	.099	.011	.234	.026	.522	.058	.657	.073	.89	.099	.144	.016	.58	.064	
33	"	11	2.11	.192	.088	.008	.231	.021	.528	.048	.66	.06	.792	.072	.143	.013	.58	.053	
34	"	12	2.5	.208	.108	.009	.288	.024	.612	.051	.756	.063	.875	.073	.17	.014	.67	.056	
35	"	16	2.9	.18	.128	.008	.304	.019	.72	.045	.88	.055	1.07	.067	.192	.012	.8	.05	
36	"	50	4.8	.096	.2	.004	.5	.01	1.2	.024	1.5	.03	1.85	.037	.3	.006	1.3	.026	
37	"	100	7.2	.072	.35	.0035	.85	.0085	2.	.02	2.5	.025	2.8	.028	.6	.006	2.2	.022	
38	"	200	9.	.045	.5	.0025	1.2	.006	2.8	.014	3.4	.017	4.2	.021	.8	.004	3.	.015	
39	"	450	9.	.02	.9	.002	1.8	.004	4.5	.01	5.6	.0125	6.3	.014	1.08	.0024	4.95	.011	
40	"	500	9.	.018	.75	.0015	2.	.004	5.	.01	6.25	.0125	6.5	.013	1.2	.0024	5.5	.011	
41	"	670	9.	.0134	.94	.0014	2.	.003	4.7	.007	6.	.009	8.04	.012	1.34	.002	5.35	.008	
42	"	1000	10.	.01	1.1	.0011	2.5	.0025	5.7	.0057	7.	.007	8.7	.0087	1.5	.0015	6.3	.0063	
43																			
44																			
45																			
46																			
47																			
48																			
49																			

FLASHER RELAYS

													VOLTAGE RANGE	NO. OF EQUAL FLASHES PER MIN.	TYPE	REMARKS
50	I ST.	200	7.	.035	.6	.003	1.	.005	5.	.025	6.24	.0312	5 TO 7	30 TO 40	2–ARMATURE	
51	"	300	7.	.023	.45	.0015	1.05	.0035	4.5	.015	5.4	.018	5 " 7	30 " 45	2– "	
52	"	400	12.	.030	1.	.0025	1.2	.003	8.	.02	10.	.025	8 " 12	30 " 45	2– "	
53	"	350											6 " 8	30 " 35	1– "	
54	"	800											10 " 12	30 " 35	1– "	
55	"	200							8.	.016	8.	.016	8.0	30 " 45	R.R.S. 4000	
56																
57																
58																

D. C. RELAY REQUIREMENT TABLE

NEW YORK CENTRAL LINES

SIGNAL COMMITTEE
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D.C. RELAYS AND INDICATORS

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G.R.S.Co. TYPE 'K'——U.S.& S.Co. TYPE 'DN-11' **SLOW RELEASE RELAYS** OR APPROVED RELAYS OF OTHER MANUFACTURE

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT									FIELD REQUIREMENT						REMARKS
					MIN. DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAXIMUM PICK-UP AND WORKING Normal		MAXIMUM PICK-UP AND WORKING Reverse		OPEN CIRCUIT RELEASE			MINIMUM DROP-AWAY		MAXIMUM PICK-UP AND WORKING		
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Sec.			Volts	Amps.	Volts	Amps.	
59	1 ST.	100	8.	.08	.51	.0051	1.2	.012	2.3	.023	2.9	.029	.5			.9	.009	2.6	.026	K & DN-11
60	"	400	9.	.0225	1.2	.003	2.	.005	4.4	.011	5.6	.014	.5 TO .6			1.2	.003	4.8	.012	K
61	"	400	9.	.0225	.8	.002	2.	.005	5.36	.0136	6.8	.017	1. TO 1.1			1.2	.003	6.	.015	K & DN-11
62																				
63																				
64																				
65																				
66																				

OTHER TYPES——SLOW RELEASE RELAYS

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT									SHOP AND FIELD		FIELD REQUIREMENT				REMARKS
					MIN. DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAXIMUM PICK-UP Normal		MAXIMUM PICK-UP Reverse		OPEN CIRCUIT RELEASE	MAXIMUM NORMAL WORKING		MINIMUM DROP-AWAY		MAXIMUM NORMAL PICK-UP		
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Sec.	Volts	Amps.	Volts	Amps.	Volts	Amps.	
67	1 ST.	100	10.	.1	.35	.0035	1.	.01	2.	.02	2.5	.025	.5	2.7	.027	.7	.007	2.2	.022	G.R.S.-9E
68	"	400	9.	.0225	1.	.0025	2.4	.006	5.28	.0132	6.8	.017	.5	6.8	.017	1.4	.0035	6.	.015	HALL-UNION
69	"	400	9.	.0225	.8	.002	1.8	.0045	5.	.0125	6.25	.0156	.5	6.6	.0165	1.6	.004	6.4	.015	HALL-H
70	"	400	9.	.0225	1.	.0025	2.4	.006	5.28	.0132	6.8	.017	.5 TO .6	6.	.015	1.6	.004	5.8	.0145	HALL-J
71	"	500	10.	.02	.75	.0015	1.5	.003	5.	.01	6.25	.0125	.7	8.75	.0175	1.	.002	6.	.012	U.S.& S.-9C
72	"	540	10.	.0185	.75	.0014	1.62	.003	3.78	.007	4.7	.0087	.8	6.48	.012	1.08	.002	4.86	.009	G.R.S.-9E
73	"	500	8.	.016	.4	.0008	1.15	.0023	3.42	.0068	4.3	.0086	.8	6.	.012	.9	.0018	3.75	.0075	U.S.& S.-MOD.13
74																				
75																				
76																				
77																				

Time of open circuit release is when current through relay is adjusted to initial charge for 20 seconds.

INTERLOCKING RELAYS

78 Relays to have same electrical characteristics as first range voltage contact relays of like type and resistance except that the maximum pick-up and working may be exceeded by not more than 20%.

SECOND RANGE VOLTAGE CONTACT RELAYS

79 Relays shall have same electrical characteristics as first range voltage relays except that the maximum pick-up and working may be exceeded by not more than 20%.

D. C. RELAY REQUIREMENT TABLE

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INSTRUCTIONS
C.RELAYS AND INDICATORS

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G.R.S.Co. TYPE 'K'——U.S.& S.Co. TYPE 'DP-14' **POLARIZED RELAYS** OR APPROVED RELAYS OF OTHER MANUFACTURE

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT								SHOP & FIELD		FIELD REQUIREMENT								REMARKS
					MIN. DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAX. PICK-UP AND WORKING				MAX. POLAR PICK-UP AND WORKING				MINIMUM DROP-AWAY		MAX. PICK-UP AND WORKING				
									Normal		Reverse								Normal		Reverse		
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.			Volts	Amps.	Volts	Amps.	Volts	Amps.	
80	1 ST.	4	1.15	.288	.076	.019	.176	.044	.412	.103	.476	.119	Shall be not more than 85% of the actual normal pick-up and working of the neutral armature.		T.J.O'	#44 2+2 CONTACTS	.12	.03	.448	.112	.52	.13	
81	"	200	9.	.045	.64	.0032	1.46	.0073	3.6	.018	4.2	.021					1.	.005	4.	.02	4.6	.023	
82	"	450	9.	.02	1.08	.0024	2.38	.0053	5.85	.013	6.75	.015					2.02	.0045	6.75	.015	7.65	.017	
83	"	500	12.	.024	1.35	.0027	3.5	.007	8.4	.0168	9.65	.0193					2.5	.005	9.5	.019	11.	.022	K.S.S.
84	"	670	10.	.0149	1.48	.0022	3.35	.005	7.9	.0118	9.1	.0136					2.28	.0034	8.57	.0128	9.8	.0147	
85	"	1000	10.	.01	1.6	.0016	3.7	.0037	8.4	.0084	9.7	.0097					2.5	.0025	9.1	.0091	10.5	.0105	
86																							
87																							
88																							
89																							

OTHER TYPES——POLARIZED RELAYS

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE	INITIAL CHARGE		SHOP REQUIREMENT								SHOP AND FIELD				FIELD REQUIREMENT						REMARKS
					MIN. DROP-AWAY WITHOUT CONTACT PRESSURE		MINIMUM DROP-AWAY		MAXIMUM PICK-UP				MAXIMUM POLAR PICK-UP		MAX. REVERSE WORKING		MINIMUM DROP-AWAY		MAXIMUM PICK-UP				
									Normal		Reverse								Normal		Reverse		
	Volts	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	
90	1 ST.	4	1.17	.292	.06	.015	.132	.033	.292	.073	.364	.091	Shall be not more than 85% of the actual normal pick-up of the neutral armature.		.56	.14	.08	.02	.32	.08	.4	.1	
91	"	5	1.34	.268	.07	.014	.15	.03	.335	.067	.42	.084			.64	.128	.09	.018	.37	.074	.46	.092	
92	"	200	9.	.053	.5	.0025	1.14	.0057	2.64	.0132	3.2	.016			4.8	.024	1.	.005	3.	.015	3.8	.019	
93	"	500	9.	.018	.82	.0016	1.8	.0036	4.5	.009	6.	.012			8.65	.017	1.	.002	5.	.01	6.5	.013	
94	"	670	9.	.0134	.91	.00136	2.	.0029	4.42	.0066	5.52	.00825			8.46	.0126	1.34	.002	4.9	.0073	6.1	.0091	
95	"	1000	10.	.01	1.1	.0011	2.4	.0024	5.3	.0053	6.6	.0066			10.	.01	1.5	.0015	6.	.006	7.5	.0075	
96																							
97																							
98																							
99																							
MOTOR TYPE RELAYS																							
100	1 ST.	250					2.5	.01	4.12	.0165	4.12	.0165			6.25	.025	1.	.004	4.5	.018			TYPE-HALL-FEDERAL
101	"	250					1.5	.006	5.	.02	5.	.02			9.	.036	1.	.004	5.5	.022			" -G.R.S.Co.
102	"	500					2.5	.005	8.	.016	8.	.016			9.	.018	1.	.002	9.	.018			" -HALL
103																							
104																							
105																							

D.C. RELAY REQUIREMENT TABLE

NEW YORK CENTRAL LINES
SIGNAL COMMITTEE
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D.C.RELAYS AND INDICATORS
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COLOR LIGHT SIGNAL RELAYS

ITEM NO.	VOLTAGE RANGE CONTACT	NOMINAL RESISTANCE		INITIAL CHARGE		SHOP REQUIREMENT						FIELD REQUIREMENT						REMARKS
		Arm.	Field			MINIMUM DROP-AWAY		MAX. PICK-UP AND WORKING		FIELD ENERGY		MINIMUM DROP-AWAY		MAX. PICK-UP AND WORKING		FIELD ENERGY		
	Volts	Ohms	Ohms	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	Volts	Amps.	
106	1 ST.	250	500	9.	.036	1.5	.006	5.	.02	6.	.012	1.0	.004	6.0	.024	6.	.012	HALL
107	"	250	500	9.	.036	2.5	.01	6.5	.026	6.	.012	2.	.008	7.5	.03	6.	.012	U.S.& S.Co.-Intermediate
108	"	250	500	9.	.036	2.5	.01	6.5	.026	6.	.012	2.	.008	7.5	.03	6.	.012	" -Universal
109	"	250	300	9.	.036	1.25	.005	6.	.024	7.5	.025	1.	.004	7.	.028	7.5	.025	G.R.S.Co.-S
110	"	250	300	9.	.036	1.5	.006	6.	.024	7.5	.025	1.25	.005	7.	.028	7.5	.025	" -SA
111																		
112																		
113																		
114																		
115																		
116																		
117																		
118																		
119																		
120																		
121																		
2-INDICATION RELAYS (FIELD AND ARMATURE COILS CONNECTED IN PARALLEL)																		
122	1 ST.	250(136)	300	9.	.066	2.04	.015	7.2	.053			1.5	.011	7.9	.058			G.R.S.Co.-S
123	"	250(136)	300	9.	.066	2.72	.02	7.2	.053			2.2	.016	7.9	.058			" -SA
124	"	250(167)	500	9.	.054	3.34	.02	6.5	.039			2.67	.016	7.2	.043			U.S.& S.Co.-Universal
125	"	250(167)	500	9.	.054	3.34	.02	6.5	.039			2.67	.016	7.2	.043			" -Intermediate
126	"	250(167)	500	9.	.054	2.5	.015	6.	.036			1.84	.011	6.8	.041			HALL
127																		
128																		
129																		
130																		
131																		
132																		
133																		
134																		
135																		
136																		
137																		

D. C. RELAY REQUIREMENT TABLE

NEW YORK CENTRAL LINES
SIGNAL COMMITTEE
INSTRUCTIONS
D.C. RELAYS AND INDICATORS

FEB. 28' 1930

WAH

(CONT'D ON PAGE.......)

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SPECIFICATION

PURCHASE

1. Rectifiers shall be in accordance with A. R. A. Signal Section Specifications for similar Apparatus, and in addition shall conform to the requirements herein set forth.

2. Requisition shall be worded as follows:
________Rectifiers in accordance with N. Y. C. L., S. & T. C. C. Specification 27 (Page 1), Requirement Table 27 (Page 2).
Item No.________ A. C. Volts________
Cycle________ Max. D. C. Volts_______
Max. D. C. Amps._______.

3. Rectifiers received from Manufacturer shall meet shop tests except that 10 per cent of the rectifiers of each shipment may have back-leak values 10 per cent in excess of those shown in Requirement Table.

SHOP TESTS

4. The number and kind of cells employed in making tests shall be as shown in Column 6 for the particular rectifier being tested.

5. Tests shall be made with room temperature at 25 deg. C. (77 deg. F.).
Back-leak values will vary with room temperature.

6. Cold Back-leak:
Before the A. C. supply is connected and immediately after connecting the battery to the rectifier the discharge from the battery through rectifier shall not exceed the current values shown in Column 7.

7. Hot Back-leak:
With nominal A. C. supply, shown in Column 1 connected, start charging battery at the maximum rated current shown in Column 4, or as shown on name plate of rectifier. After 2 hours charging disconnect the A. C. supply and immediately determine discharge from the battery through rectifier. This current value shall not exceed the value shown in Column 8.

8. Normal Back-leak:
After determining the hot back-leak value with A. C. supply disconnected and with the battery connected, allow the rectifier and battery to stand for 2 hours, then determine discharge from the battery through rectifier. This current value shall not exceed the value shown in Column 9.

9. Capacity Test:
With nominal A. C. supply shown in Column 1 connected and rectifier connected to the battery as shown in Column 6, determine that maximum and minimum rated D. C. charging current shown in Columns 4 and 5 respectively, or as shown on name plate of rectifier, can be obtained by means of adjustment provided with the rectifier.

NOTE:- Columns referred to are those on Page 2 of the Specification.

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

SPECIFICATION
RECTIFIERS
COPPER OXIDE

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
M.C.R.R.
C.C.C.&ST L.RY.
B.&A.R.R.
P. & L.E.R.R.
RUTL.R.R.

27

ISSUE	DATE
1	11-8-1932

Approved by Representatives of Lines shown.
JCMock
Chairman

WAH

(CONT'D ON PAGE 2)

DEPT. 41
APR
14
1933

REQUIREMENT TABLE

COPPER OXIDE RECTIFIERS									TESTS					REMARKS
									SHOP				FIELD	
Item No.	CLASS OF SERVICE	NO. OF CELLS		RATING					Test with Lead Storage Battery	BACK-LEAK			Normal Back-leak	
				Nominal A.C. Supply	D. C. OUTPUT					Cold	Hot	Normal		
					Volts		Amperes							
		Lead	Nickel Iron	(1) Volts	(2) Max.	(3) Min.	(4) Max.	(5) Min.	(6) Cells	(7) Amps.	(8) Amps.	(9) Amps.	(10) Amps.	
1	Track	1	1 or 2	110	3.	1.5	1.4	.250	1	.010	.024	.016	.040	
2														
3	Track	1	1 or 2	5	3.	1.5	1.4	.250	1	.010	.024	.016	.040	
4														
5														
6														
7														
8	Emergency *	1 to 6	1 to 9	220-110-20	13.5	1.5	4.4	.600	5	.019	.096	.038	.096	
9	Signal-Interlocking	5 or 6	7 or 9	110	13.5	8.	.35	.080	5	.004	.010	.0065	.016	
10	"	5 or 6	7 or 9	20	13.5	8.	.35	.080	5	.004	.010	.0065	.016	
11	"	5 or 6	7 or 9	110	13.5	8.	1.1	.250	5	.010	.024	.019	.048	
12	"	5 or 6	7 or 9	20	13.5	8.	1.1	.250	5	.010	.024	.019	.048	
13	"	5 or 6	7 or 9	110	13.5	8.	2.2	.500	5	.019	.048	.038	.096	
14	"	5 or 6	7 or 9	20	13.5	8.	2.2	.500	5	.019	.048	.038	.096	
15	"	6 to 8	9 to 12	110	20.	10.	3.5	.600	6	.017	.057	.028	.070	
16	"	6 to 8	9 to 12	110	20.	10.	7.	1.000	6	.035	.101	.068	.170	
17	"	6 to 8	9 to 12	110	20.	10.	10.5	1.500	6	.053	.151	.102	.256	
18														
19														
20														
21	Remote Control	10 to 14	15 to 20	110	30.	20.	1.1	.250	10	.010	.032	.019	.048	
22	"	10 to 14	15 to 20	50	30.	20.	1.1	.250	10	.010	.032	.019	.048	
23														
24	Interlocking	55 to 57	87 to 90	110	144.	100.	3.	.350	55	.044	.160	.104	.260	
25	"	55 to 57	87 to 90	110	144.	100.	1.5	.150	55	.022	.080	.056	.140	
26	"	58 to 72	91 to 110	110	180.	130.	3.	.350	70	.038	.118	.074	.184	
27	"	58 to 72	91 to 110	110	180.	130.	1.5	.150	70	.020	.059	.040	.100	**NOTE:** * For use on either 25 or 60 Cycle.
28														
29														
30														
31														

SIGNAL AND TRAIN CONTROL COMMITTEE
NEW YORK CENTRAL LINES
REQUIREMENT TABLE
RECTIFIERS
COPPER OXIDE

ISSUE	DATE	
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INSTRUCTIONS

GENERAL

1. Rectifiers must be kept clean and dry.

2. Bolts, nuts, dowel pins, screws, binding posts, rivets, nut locks, jam nuts, etc. must be kept in place, in good condition and tight.

3. Rectifier should be mounted with cooling fins vertical and must not be located where they are subjected to heat from other apparatus, radiators, etc.

4. Rectifier must not be loaded in excess of rated maximum current and voltage output.

5. Alternating current supply should be of nominal voltage and frequency as specified on the name plate of the rectifier.

6. In emergency 25 cycle rectifiers may be used on 60 cycle supply.

60 cycle rectifiers must not be used on 25 cycle supply. Emergency rectifier, item 8 on Requirement Table, isdesigned to operate on either 25 or 60 cycle supply.

FIELD TEST

7. If it is necessary to frequently change the adjustment of the rectifier to maintain the required battery voltage when there is no appreciable increase in the battery load, test should be made to determine if normal field back-leak is in excess of values shown in Column 10 of Requirement Table. The back-leak shall be determined by placing ammeter in D. C. charging circuit and noting current discharge from battery after A. C. supply has been disconnected.
If the value obtained exceeds that shown in Column 10 the A. C. supply should be left disconnected for 2 hours. If the back-leak value is still in excess of that shown in Column 10 the rectifier should be replaced and the back-leak current and the air temperature adjacent to rectifier recorded on Repair Tag, Form SC-9 and the tag attached to rectifier.

NOTE:-Columns referred to are those on Page 2 of this Specification.

SIGNAL AND TRAIN CONTROL COMMITTEE	ISSUE	DATE	
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HOUSING

1 Battery should be isolated in a room or box, as the acid fumes given off during charge are of a corrosive nature. This space should be well ventilated and lighted, and as dry as practicable.

2 Inside of housing should contain no exposed metal work other than lead. If this is not practicable, such metal parts should be protected by at least 2 coats of acid-proof paint.

3 Floor of battery room should be sloped to provide proper drainage.

4 Floor should be preferably of vitrified brick, joined with petroleum asphaltum.

5 Where battery boxes are placed adjacent to track, the opening for ventilation should be on the side away from the track.

SUPPORTS

6 Battery should be supported on wooden racks or shelves of sufficient strength to prevent sagging, or placed on layer of sand on floor of battery box. They should be arranged so as to permit access for inspection and cleaning and for the removing of any cell or element.

ERECTION

7 Fill the sand trays to a level ⅛ inch below top with clean, dry sand. Space trays uniformly on supports so as not to touch adjacent trays.

8 Clean the jars and press them into sand until they have solid bearing and are in proper alignment.

9 Scrape the contact surfaces of connecting straps of elements to insure good electrical connection.

10 Place a positive and a negative group inside each jar in such a manner that the positive and negative plates will alternate with the 2 outside plates, negative. Arrange the groups so that the positive group of 1 cell will connect with a negative group of the adjacent cell. Straighten the plate lugs to prevent them from touching each other.

11 Bolt the connecting straps together with the bolt connectors, making each connection tight. Apply vaseline to brass bolts before connection is made. Connect rows of cells with lead tape or rubber-covered copper wire. Cover all bolt connectors and exposed copper with vaseline.

12 Connect the charging circuit wires to the battery terminals with the positive wire of the charging circuit connected to the positive or dark brown element.

13 Before proceeding further inspect all connections carefully to insure that they are tight and properly made, positive to negative. Be sure that charging current at proper voltage and under control is available, and that the initial charge can be started immediately and can be continued to its completion.

14 Unpack and partially dry the wooden separators, which include veneers and posts. Insert the veneers in the posts with the grain of the veneer crosswise to the post. Place the separators between adjacent positive and negative plates with the posts vertical. Place the glass hold-down in position in each cell.

15 Immediately after separators are placed in position, fill the cells with electrolyte to a height of ¾ inch above the tops of the plates or to the electrolyte line. The electrolyte should be of 1.210 specific gravity, at 70 deg. Fahrenheit.

16 Start the initial charge immediately after the electrolyte has been added to the cells.

INITIAL CHARGE

17 Continue the initial charge for 10 hours after maximum voltage and gravity have been reached. This should require from 40 to 60 hours at the normal rate. If the temperature of the electrolyte exceeds 110 deg. F., the charge should be stopped until the battery cools.

18 Adjust the charging current to the normal 8 hour charging rate and maintain this value throughout the charge. Readings should be taken on every cell with a low reading volt-meter immediately after starting the charge, to insure that all the connections are properly made, positive to negative, and that no short circuit exists.

19 At ½-hour intervals during the course of the charge, read the battery voltage and also the specific gravity of 1 or 2 selected cells. The voltage and specific gravity should rise as the charge progresses, and near the end of charge each should have reached maximum value. At the end of the charge, all the cells should be gassing freely, and the specific gravity of the electrolyte in every cell should be stationary.

20 If at the end of charge the electrolyte is not at 1.210 specific gravity, at 70 deg. F., it should be adjusted to this value, at the proper height above the plates.

SPECIFIC GRAVITY

21 To raise the specific gravity, electrolyte of a higher density, or, if this is not available, electrolyte of 1.210 specific gravity should be added before next charge. To lower specific gravity, water should be added. If necessary, remove a part of the solution from battery before adding electrolyte or water.

WATER

22 Water used in batteries should either be distilled or from a source which has been tested and approved for storage battery use.

GAS

23 As the cells give off gas care must be used to avoid electric sparks and keep open flame away from the battery in order to prevent an explosion. Sparks may be produced when using tools or from static discharge by contact with the body or otherwise.

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29C

9-8-1921
5-22-1932
9-30-1943

LEAD TYPE STATIONARY STORAGE BATTERY

INSTRUCTIONS

Approved by Representatives of Lines shown.

Chairman

GENERAL PRECAUTIONS

1 Lead battery electrolyte must not be used.

2 Tools, hydrometers, or utensils which have been used on lead batteries must not be used.

3 Cells must not be exposed to the gases of lead batteries or placed where they will come in contact with lead batteries or acid-soaked charging racks or trays.

4 Cells must not be placed directly on a damp floor or a damp shelf. If a dry surface is not available, they must be placed on suitable insulators to avoid grounds and possible damage to the cell containers.

5 An exposed flame must not be allowed near the battery, as the gases being given off may explode. Care must be exercised in use of tools near the battery terminals to prevent striking an arc. To prevent drawing an arc connecting or disconnecting cells, the load and charging circuits must be disconnected at a point away from the battery.

6 When battery is being charged, enough ventilation or space must be provided to avoid pocketing of the gases.

7 Filler caps must be kept closed except when necessary to have them open for watering, taking temperatures, gravity, etc. Where cells are provided with screw type valve assemblies, the knurled rings must be removed when cells are placed in service. Whenever cells are to be moved, knurled rings are to be replaced.

8 If solution is accidently spilled on the skin or clothing, it should be immediately washed away with plenty of water.

9 The elements must be covered by electrolyte at all times.

PURCHASE AND RECEIPT OF CELLS

10 New cells purchased shall be equipped with screw type valve.

11 Cells must be shipped in a fully charged condition.

12 After unpacking the cells, carefully remove all packing material or other foreign substance from cells and trays with particular reference to space between and underneath the cells. Cells must not be lifted by their terminals.

13 Test the height of solution in every cell to see if any has been spilled in shipment. If the solution is below the recommended level as shown in Paragraph 14 but above the plate tops, add distilled or approved water to raise level to proper height. If solution level is below plate tops, add Edison Refill Solution (1.215 specific gravity at 60° F.) undiluted, or if this is not readily available, use Edison Standard Renewal Solution (1.250 specific gravity at 60° F.) to which ⅕ of distilled or approved water has been added to the total volume. Where neither Refill or Renewal Solution is available and levels are below plate tops, the battery must not be placed in service until proper solution is available.

14 The correct and minimum solution levels for cells is as follows:

	CORRECT SOLUTION HEIGHT ABOVE PLATE TOPS	MINIMUM SOLUTION HEIGHT ABOVE PLATE TOPS
"AH" (High Type Cells)	3"	1½"
"BH" (High Type Cells)	2¼"	1"
"A-B-N" (Low Type Cells)	½"	Must cover plates

15 Cells which are to be stored for an indefinite period should be trickle charged continuously at a rate equivalent to 2 mils per 8-hour ampere-hour capacity rating of cell or stored in a fully discharged condition per Paragraph 30.

INSTALLATION AND CHARGING

16 Except for new cells received from manufacturer, the surface of all terminals must be cleaned with a cloth moistened with mineral solvent (Stoddard or equal) and, where necessary, polished with very fine emery or crocus cloth. Cells must be connected together with inter-cell connectors and inter-tray jumpers furnished for this purpose.

17 Cells must be permanently installed in the trays supplied and held in place to prevent movement.

18 After connecting cells in a series-connected battery, test each cell with a voltmeter to assure that the positive terminal of each cell is connected to the negative terminal of the adjoining cell.

19 Arrange connections so that positive terminal of the rectifier or charging source is connected to the positive terminal of the battery. Direct current only must be used for charging.

20 After installation, be sure all cells are fully charged before attempting to set the rectifier at the normal charging rate required at the location. If there is any doubt as to the battery being fully charged, first bring the solution to the proper level, and then set the rectifier at its maximum safe output until the cells receive a charge equal to 25% more in ampere hours than their 8 hour rating shown in Paragraph 31. During this high floating rate charge the solution must not be allowed to fall below the minimum solution level as listed in Paragraph 14.

21 After cells are fully charged, promptly reduce the high charging current to a value calculated to be slightly higher than the normal float charge rate. The charging rate should then be gradually reduced from week to week until consecutive voltage readings of individual cells at normal solution temperatures of from 60 to 70 degrees Fahrenheit consistently remain between 1.5 and 1.6 volts per cell. After establishing the proper rate in this manner, it should not be changed as voltages rise and fall due to temperature alone. The voltages shown in the following table are typical of fully charged cells when being charged at a minimum rate to offset losses of the cells. (See Paragraph 22.)

Solution Temp. Degrees F.	80	70	60	50	40	30	20	10	0
Voltage per Cell	1.48	1.50	1.52	1.55	1.58	1.60	1.61	1.62	1.63

Where the charging current is higher than the minimum rate to offset losses of the battery (Paragraph 22) the cell voltages should remain higher than shown in the above table.

22 When making the final adjustment of the charging rate, make sure that the charging current to the battery is not less than two milliamperes for each ampere hour of rated capacity based upon the 8-hour capacity rating shown in Paragraph 31.

23(a) If there is a noticeable reduction in cell voltage during normal operation not due to change in solution temperature, the charging current should be increased sufficiently so that consecutive voltage readings consistently remain the same in accordance with voltage information contained in Paragraph 21.

23(b) In the event a battery becomes discharged to any appreciable extent, increase the charging current to the maximum safe value of the rectifier after first raising the solution level of each cell to proper height, and proceed as per Paragraph 21.

24 At time of installation the specific gravity reading of each cell should be recorded on Storage Battery Record Card, Form SC-27.

MAINTENANCE

25 General

(a) The voltage of each individual cell must be taken at least once each month or as otherwise directed, or as required by special conditions, and all voltage readings recorded on Storage Battery Record Card, Form SC-27.

(b) It is essential that voltmeter be kept in calibration.

(c) Terminal nuts must be checked at intervals after installation to insure tight connections.

(d) Battery, its connections and surrounding parts must be kept clean and dry. Vent and valves in filling aperture must be clean and free from obstruction to allow generated gas to escape.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

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30C

7-22-1939
9-30-1943
10-14-1952

NICKEL-IRON STORAGE BATTERY
INSTRUCTIONS

Approved by Representatives of lines shown.

Chairman.

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(e) A very light film of primary battery oil or Esbaline must be applied to the inner side of the valve housing and valve stem assembly to prevent creeping electrolyte and to insure proper operation of the valve. Care must be exercised to avoid spilling oil or Esbaline into the cell.

(f) When terminal connections show evidence of corrosion, they must be polished with fine emery or crocus cloth.

(g) Cells, other than those of monel metal which are marked MO on cell tops, must be periodically inspected to insure that cell containers are not rusting. If evidence of rust appears, containers should be repainted as per instructions in Paragraph 29.

(h) Tops of cells must be kept clean and coated with a very light film of primary battery oil or Esbaline applied with a brush or cloth.

26 Watering

(a) Distilled or approved water should be added to cells when electrolyte level falls to the minimum permissible height above plate tops to raise the level of the electrolyte to the correct solution level shown in Paragraph 14.

(b) After adding distilled or approved water to cells in cold weather, thoroughly mix the water with the electrolyte by agitating with a hydrometer or syringe.

(c) Water used in cells must not be stored or transported except in receptacles provided for this purpose. These receptacles must be kept clean and covered and not used for any other purpose.

(d) Electrolyte must not be added to cells except to replace loss due to spillage; then Edison REFILL electrolyte (1.215 gravity at 60° F.) should be used.

27 Specific Gravity

(a) Specific gravity readings are not taken to determine state of charge but to determine the condition of the electrolyte.

(b) Specific gravity readings of electrolyte must be taken once each year with the electrolyte level at proper height above plate tops.

(c) To obtain the proper specific gravity of electrolyte, readings should be taken only after the cells have been fully charged. In floating charge service, where cells are normally kept in a fully charged condition, the specific gravity readings should not be taken for at least 24 hours after adding water to cells.

(d) If the specific gravity is less than the value shown in the following table for the existing solution temperature, then the solution should be renewed.

TEMPERATURE OF ELECTROLYTE	MINIMUM RECOMMENDED GRAVITY All Type Cells
110° F.	1.147
100° F.	1.150
90° F.	1.152
80° F.	1.155
70° F.	1.157
60° F.	1.160
50° F.	1.162
40° F.	1.165
30° F.	1.167
20° F.	1.170
10° F.	1.172
0° F.	1.175

28 Solution Renewal

(a) Discharge cells to 0.5 volt per cell at normal 5-hour discharge rate.

(b) Short circuit cells for at least 2 hours in groups of not more than 5 series cells.

(c) Remove cells from trays.

(d) Pour out and discard exhausted electrolyte.

(e) The cells must then immediately be filled with Edison Standard RENEWAL Electrolyte (1.250 specific gravity at 60° F.) to the proper normal level.

(f) After electrolyte has been added, cells and trays should be painted in accordance with Paragraph 29, where necessary.

(g) To prepare cells for service, charge at the normal 5-hour discharge rate for 15 hours. (See Paragraph 31.)

29 Painting

(a) Cells with monel metal containers, marked MO on cell tops, do not require painting.

(b) Remove the individual cells from the tray and apply solvent by brushing or dipping, allowing approximately one hour to soften the paint. When removing paint, particular care must be taken to prevent solvent or particles of paint from entering the cell. Naptha is to be used as a solvent for Esbalite and Stanisol for Glyptal.

(c) Inspect the trays for defects, making repairs where necessary.

(d) When paint on the cells is sufficiently softened, remove with a stiff brush after which the surface of the container should be wiped clean with mineral solvent.

A steel brush or metal scraper must not be used to remove paint.

(e) Cells must be examined for defects. Lid group assembly should be in proper alignment so as to assure free operation of the valve. The terminal post gland caps should be screwed down tight, particularly where there is evidence of leakage around the stuffing box assembly.

(f) After inspection, the sides and bottoms of the cells should be brush-painted or dipped in Esbalite or Green Glyptal paint, taking particular care to insure that the bottoms of the cells are thoroughly coated. A thin coating of primary battery oil or Esbaline should then be applied with a brush or both to the tops of the cells.

(g) After the cells are dry, clean the poles with fine emery or crocus cloth and assemble in trays. Replace the intercell connectors and tighten nuts securely with special wrench provided for the purpose.

30 Storage

(a) Either new or used Edison Cells may be stored for an indefinite length of time by discharging to 0.5 volt per cell at normal 5-hour discharge rate, short circuit cells for at least two hours in groups of not more than 5 series connected cells and raise solution level to proper height. Store in a cool, dry place.

(b) Cells which have been in storage may be prepared for service by cleaning cells and connectors, bringing solution level to proper height and charging for 15 hours at the 5-hour discharge rate.

CAPACITY AND DISCHARGE RATING

31 The following table gives the ratings for the various types and sizes of Edison Storage Cells ordinarily used in signal service:

TYPE CELL	5 HR. RATING AMP. HR. CAPACITY	5 HR. RATING AMP. DISCHARGE RATE	8 HR. RATING AMP. HR. CAPACITY	8 HR. RATING AMP. DISCHARGE RATE
N2	11.25	2.25	12	1.50
B1, B1H	18.75	3.75	20	2.50
B2, B2H	37.50	7.50	40	5.00
B4, B4H	75.00	15.00	80	10.00
B6, B6H	112.50	22.50	120	15.00
A4, A4H	150.00	30.00	160	20.00
A5, A5H	187.50	37.50	200	25.00
A6, A6H	225.00	45.00	240	30.00
A7, A7H	262.50	52.50	280	35.00
A8, A8H	300.00	60.00	320	40.00
A10, A10H	375.00	75.00	400	50.00
A12, A12H	450.00	90.00	480	60.00
A14, A14H	525.00	105.00	560	70.00
A16, A16H	600.00	120.00	640	80.00

SIGNAL AND TRAIN CONTROL COMMITTEE **30C**

NICKEL-IRON STORAGE BATTERY
INSTRUCTIONS

7-22-1939
9-30-1943
10-14-1952

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GENERAL

Conductors of proper gauge for 110 to 550 volt signal power circuits may be included in cables under headings 2, 3, 4 and 5.

* * *

1 TRACK AND INDUCTOR CONNECTIONS

SINGLE CONDUCTOR CABLE, NON-METALLIC SHEATH.

Ordering reference. SPECIFICATIONS 376—NYC Elect'l Dept.

....................ft. No. 8 AWG 19 strand (inductor to terminal box).

....................ft. No. 6 AWG solid (track shunts).

....................ft. No. 10 AWG solid (relay and battery to track).

* * *

2 UNDERGROUND RUNS WITHOUT DUCTS

(a) MULTIPLE CONDUCTOR CABLE, NON-METALLIC SHEATH.

Ordering reference. SPECIFICATIONS 379—NYC Elect'l Dept.

....................ft. cable consisting of:

....................conductors No. 4 AWG solid.

....................conductors No. 6 AWG solid.

....................conductors No. 8 AWG solid.

....................conductors No. 10 AWG solid.

....................conductors No. 12 AWG solid.

....................conductors No. 14 AWG solid.

* * *

(b) MULTIPLE CONDUCTOR CABLE, LEAD SHEATH.

Ordering reference. SPECIFICATIONS 393—NYC Elect'l Dept.

See 2 (a) for schedule of conductors.

When authorized by Signal Engineer Parkway sheath may be used.

* * *

3 UNDERGROUND RUNS WITH DUCTS

(a) MULTIPLE CONDUCTOR CABLE, LEAD SHEATH.

Ordering reference. SPECIFICATIONS 327—NYC Elect'l Dept.

See 2 (a) for schedule of conductors.

For aerial runs when authorized by Signal Engineer.

* * *

(b) MULTIPLE CONDUCTOR CABLE, NON-METALLIC SHEATH.

Ordering reference. SPECIFICATIONS 379—NYC Elect'l Dept.

See 2 (a) for schedule of conductors.

Order only on approval of the Signal Engineer.

* * *

4 SUBMARINE CABLE

MULTIPLE CONDUCTOR CABLE, LEAD SHEATH, ARMORED.

Ordering reference. SPECIFICATIONS 335—NYC Elect'l Dept.

See 2 (a) for schedule of conductors.

5 AERIAL CABLE

MULTIPLE CONDUCTOR CABLE, BRAID COVERED.

(for runs or temporary work on the surface of the ground).

Ordering reference. SPECIFICATIONS 330—NYC Elect'l Dept.

....................ft. cable consisting of:

....................conductors No. 8 AWG solid.

....................conductors No. 10 AWG solid.

....................conductors No. 12 AWG solid.

....................conductors No. 14 AWG solid.

* * *

6 110 TO 550 VOLT SIGNAL POWER CIRCUITS IN CABLE ON POLE LINE WHERE SEPARATE POWER CABLE IS REQUIRED

(a) TWIN CONDUCTOR CABLE, BRAID COVERED.

Ordering reference. SPECIFICATIONS 330—NYC Elect'l Dept.

....................ft. cable consisting of:

....................conductors No. 4 AWG solid.

....................conductors No. 6 AWG solid.

....................conductors No. 8 AWG solid.

When authorized by Signal Engineer lead sheath cable specifications 311 (NYC Elect'l Dept.) may be used.

* * *

(b) TRIPLE CONDUCTOR CABLE, BRAID COVERED.

Ordering reference. SPECIFICATIONS 330—NYC Elect'l Dept.

See 6 (a) for schedule of conductors.

When authorized by Signal Engineer lead sheath cable specifications 386 (NYC Elect'l Dept.) may be used.

* * *

7 MISCELLANEOUS OUTSIDE WIRING AND POLE LINE DROPS

SINGLE CONDUCTOR SIGNAL WIRE.

Ordering reference. SPECIFICATIONS 320—NYC Elect'l Dept.

....................ft. No. 4 AWG 7 strand, 500 to 1000 ft. per coil.

....................ft. No. 6 AWG solid, 1000 to 1350 ft. per coil.

....................ft. No. 8 AWG solid, 1500 to 2000 ft. per coil.

....................ft. No. 10 AWG solid, 1500 to 2000 ft. per coil.

....................ft. No. 12 AWG solid, 1500 to 2000 ft. per coil.

....................ft. No. 14 AWG solid, 1500 to 2000 ft. per coil.

* * *

8 INSIDE WIRING, BUILDINGS, BOXES, ETC., WHERE NOT EXPOSED TO WEATHER

SINGLE CONDUCTOR BRAIDED CABLE.

Ordering reference. SPECIFICATIONS 396—NYC Elect'l Dept.

....................ft. No. 12 AWG 19 strand, 1000 to 1500 ft. per coil.

....................ft. No. 14 AWG 19 strand, 1000 to 1500 ft. per coil.

Order solid on approval of the Signal Engineer.

9 SIGNAL SHOP—MISCELLANEOUS COIL LEADS, ETC.

SINGLE CONDUCTOR, WEATHERPROOF, FIXTURE WIRE.

Ordering reference. SPECIFICATIONS 392—NYC Elect'l Dept.

Except with black glazed braid.

....................ft. No. 16 AWG flexible 19 strand, 1000 to 1500 ft. per coil.

....................ft. No. 18 AWG flexible 19 strand, 1000 to 1500 ft. per coil.

.... { ft. No. 18 AWG flexible 19 strand, 1000 to 1500 ft. per coil. Except to have 1/64 in. rubber.

* * *

10 LINE WIRE

(a) DOUBLE BRAID, WEATHERPROOF, 30 PER CENT COPPER COVERED STEEL.

(CIRCUITS LESS THAN 100 VOLTS)

Ordering reference. SPECIFICATIONS 403—NYC Elect'l Dept.

....................lb. No. 10 AWG (Specify reels or coils)

* * *

(b) DOUBLE BRAID, WEATHER PROOF, SOLID COPPER.

(CIRCUITS 110 TO 550 VOLTS)

Ordering reference. SPECIFICATIONS 370—NYC Elect'l Dept.

....................lb. No. 4 AWG (specify reels or coils)

....................lb. No. 6 AWG (specify reels or coils)

....................lb. No. 8 AWG (specify reels or coils)

* * *

11 SLEEVING

(a) FOR STRANDED CONDUCTORS.

Ordering reference, ANCHOR WEBBING CO., Pawtucket, R. I. (or equivalent)

....................lb. No. 9 sleeving (110 yd. per lb.) for No. 14, 12 and 10 wire.

....................lb. No. 11 sleeving (60 yd. per lb.) for No. 8 wire.

....................lb. No. 12 sleeving (79 yd. per lb.) for No. 6 and 4 wire.

* * *

(b) FOR SOLID CONDUCTORS.

....................lb. No. 9 sleeving (110 yd. per lb.) for No. 14, 12 and 10 wire.

....................lb. No. 10 sleeving (70 yd. per lb.) for No. 8 and 6 wire.

* * *

NOTE: To meet special conditions the above references and instructions may be varied from on authority of the Signal Engineer.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

WIRES AND CABLES
ORDERING REFERENCES AND INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL. R.R.

31	
ISSUE	DATE
1	5-5-1936

Approved by Representatives of Lines shown.

J.C. Mock

Chairman

(CONT'D ON PAGE 2)

DEPT. 41
JUL
3
1936
U. S. & S. CO.

1 Inspection must be made of circuit controllers, connections, adjustments and shunt connections at least monthly.

2 Bolts, nuts, dowel pins, screws, binding posts, rivets, nut locks, jam nuts, etc., must be in place, in good condition and tight.

3 Bearings and pins must be properly lubricated and have minimum lost motion practicable. Mechanical connections must be tight.

4 Switches, derails, movable point frogs and slip switches must be inspected to determine that they are properly braced and fitted to rails. Switch stands must be securely fastened and switch rods and connections have minimum lost motion to insure that train movement over switch will not force switch points or stock rails sufficient to open contact of controller. Switch layouts must be equipped with sufficient rail anchors to prevent running of points. The track department must be notified of any track conditions which may prevent proper operation of switch circuit controller.

5 Test must be made to insure that movement of trains over switch, derail, or movable point frog points will not force the points or stock rail sufficiently to open switch circuit controller contacts which may interfere with proper operation of signaling on an adjacent track. Tests shall be made by connecting a voltmeter across coils of switch repeating relay when used and if not used across circuit controller contacts noting whether the reading remains constant while a train is passing over switch.

6 Controllers must be kept clean, properly lubricated and inside free as practicable from moisture.

7 Rollers and shafts must operate freely without excessive lost motion.

8 Rollers of spring actuated contacts must not touch bottom of cam notches.

9 Contact surfaces must meet squarely, be clean, free from pits and burns and when closed have proper tension and contact slide of not less than 1/32 in. Contact opening shall be not less than 1/16 in.

10 Controllers must be so wired that contacts for control circuits will be forced open and contacts for track shunting circuits will be forced closed.

11 Contacts that shunt track circuit must be adjusted to close when point is open ¼ in. and remain closed for the remainder of the throw.

12 Contacts that are closed only in full normal or in full reverse position of points must open when point is opened ¼ in. and remain open for the remainder of the throw.

13 Contacts referred to in Instructions 11 and 12 must be adjusted not to exceed ½ in. movement when switch circuit controller is operated by lifting type derail or bolt lock connection.

14 Ventilators must be maintained to allow free circulation of air.

15 Contact make and break points must be maintained as required by circuit plans.

16 Effectiveness of track shunt must be determined at least quarterly by operating only the shunting contacts. Each contact must be tested separately.

17 Effectiveness of contacts for control circuits must be determined at least quarterly by operating only the control contacts. Each contact must be tested separately.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

INSTRUCTIONS
MAINTENANCE OF
SWITCH
CIRCUIT CONTROLLERS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

32

ISSUE	DATE
1	12-7-1922
2	12-14-1933

Approved by Representatives of Lines shown.
J C Mock
Chairman

WAH

RECEIPT OF SHIPMENT.

1 Cells must be shipped to Storehouse or installation point in fully charged condition.

2 Cells must be unpacked carefully, keeping them in upright position. Cells must not be lifted by terminals.

3 After unpacking, the height of the electrolyte in each cell should be measured and raised to proper level, if necessary, by adding distilled or approved water, unless there is evidence of spillage in the form of yellow stains in packing case, in which case add Edison Refill Electrolyte to approximate specific gravity 1.217 at 60 deg. F. Elements must be covered by electrolyte at all times.

To obtain the proper specific gravity of electrolyte, readings should be taken only after the cells have been fully charged. In cycle charge water must be added before charging and sufficient time allowed thereafter for solution to thoroughly mix. In floating charge where cells are normally kept in a fully charged condition specific gravity readings should not be taken for at least 24 hours after adding water.

After adding distilled water in cold weather, thoroughly mix the water with the electrolyte by agitating with hydrometer syringe.

4 The normal solution level for cells is as follows:

"A" High type cells	3	in. above plates
"B" High type cells	2¼	in. above plates
"A-B-N" Low type cells	½	in. above plates
"C" Low type cells	1	in. above plates

5 Cells must not stand idle for more than 30 days. Charge periodically or float continuously at rate to maintain 1.5 to 1.6 volts per cell.

INSTALLATION AND MAINTENANCE.

6 Before connecting cells, all surfaces which are to be bolted together must be cleaned with a cloth moistened with gasoline and then polished with very fine sand paper, after which a light application of oil should be applied. Cells must be connected together with the intercell connectors furnished.

7 A permanent number must be assigned to each cell, preferably stenciled on rack.

8 Cells must be separated from each other and adjacent objects by at least ¼ in. and held in place to prevent movement. When trays are furnished with battery they shall be used.

9 After all intercell connections are completed, test each cell with a voltmeter to determine that the positive terminal of each cell is connected to negative terminal of adjoining cell.

10 The normal specific gravity of electrolyte of new cells is approximately 1.215 at 60 deg. F. and remains practically constant during charge or discharge and therefore does not indicate amount of charge in cell. The specific gravity of the electrolyte varies with its temperature and to correct subtract .001 for each 4 deg. below 60 deg. F. and add .001 for each 4 deg. above 60 deg. F.

11 Arrange connections so that the positive terminal of the rectifier or charging source will connect with the positive terminal of the battery. Direct current only must be used for charging.

12 After installation, charge cells at the maximum rated output of the rectifier and continue this charging rate until cells are fully charged. Record each week on Storage Battery Record Card, Form SC-27, the individual cell voltages during original charge. Cells will be fully charged when 3 equal consecutive voltage readings in excess of 1.60 volts per cell are obtained at 60 deg. to 70 deg. F. solution temperature. At convenient intervals thereafter, reduce the output of the rectifier in small steps until the voltage directly at the cell terminals generally stays between 1.50 and 1.60 volts at 60 deg. to 70 deg. F. solution temperature. The voltage may vary below or above these limits according to traffic conditions, power interruptions or cell temperature but should not be continually above or below these limits. At 120 deg. F., or above, in extreme cases, the same charging rates may result in cell voltages of only 1.4, while at unusually low temperatures they may result in charging voltages of 1.7.

13 After original charge, the voltage of each individual cell must be taken at least each month, or more frequently if required by special conditions and record on Storage Battery Record Card, Form SC-27.

14 It is essential that the voltmeter be kept in calibration.

15 Do not make too frequent adjustments of the rectifier output.

16 A storage battery requires a certain amount of current input to overcome loss of charge due to internal local action and it is always necessary to have charging rate in excess of discharge rate.

17 Always keep electrolyte at proper level, using distilled or approved water only for replacing evaporation. Never add electrolyte unless same is lost. Edison Refill Electrolyte of 1.217 specific gravity should be used.

18 Specific gravity readings of electrolyte must be taken once each year and if gravity is less than 1.160 at 60 deg. F. the electrolyte must be renewed.

19 When necessary to renew electrolyte the cell must be discharged at 5 Hr. rate to .5 volts, whereupon a short circuit must be applied across terminals, in groups of not more than 5 series connected cells, for not less than 3 hours before removing old electrolyte. Pour off about one-half of the electrolyte into a receptacle and then shake cell vigorously to loosen sediment in bottom of cell. Pour out remaining electrolyte and use that in receptacle for further rinsing.

20 Terminal nuts must be checked at intervals after installation to insure tight connections.

21 In case a battery becomes discharged to any appreciable extent increase the output of rectifier to the maximum rating and proceed as per Instruction 12. It may be advisable to replace battery or employ rectifier of larger capacity. Supervisor must be notified if battery becomes fully discharged.

22 Keep battery, its connections and surrounding parts clean and dry. Vents and valves in filling aperture must be clean and free from obstructions to allow generated gas to escape. Keep a light film of battery oil on the inner side of the valve housing and valve stem assembly to prevent creeping solution and to insure proper operation of the valve.

23 If terminal connections show any evidence of corrosion they must be polished with fine sand paper and then wiped with any oily cloth.

24 Trays and cells must be frequently inspected to insure that cell containers are not rusting. If evidence of rust appears, cell containers should be thoroughly cleaned and dried and repainted with approved paint.

25 Water for electrolyte must not be stored or transported except in receptacles provided, which must be kept clean and covered and not used for any other purpose.

26 Cells taken out of service for more than 2 months must either be kept on charge per Instruction 5, or must be discharged per Instruction 19. The cells must be stored in a dry place and electrolyte maintained at proper level

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

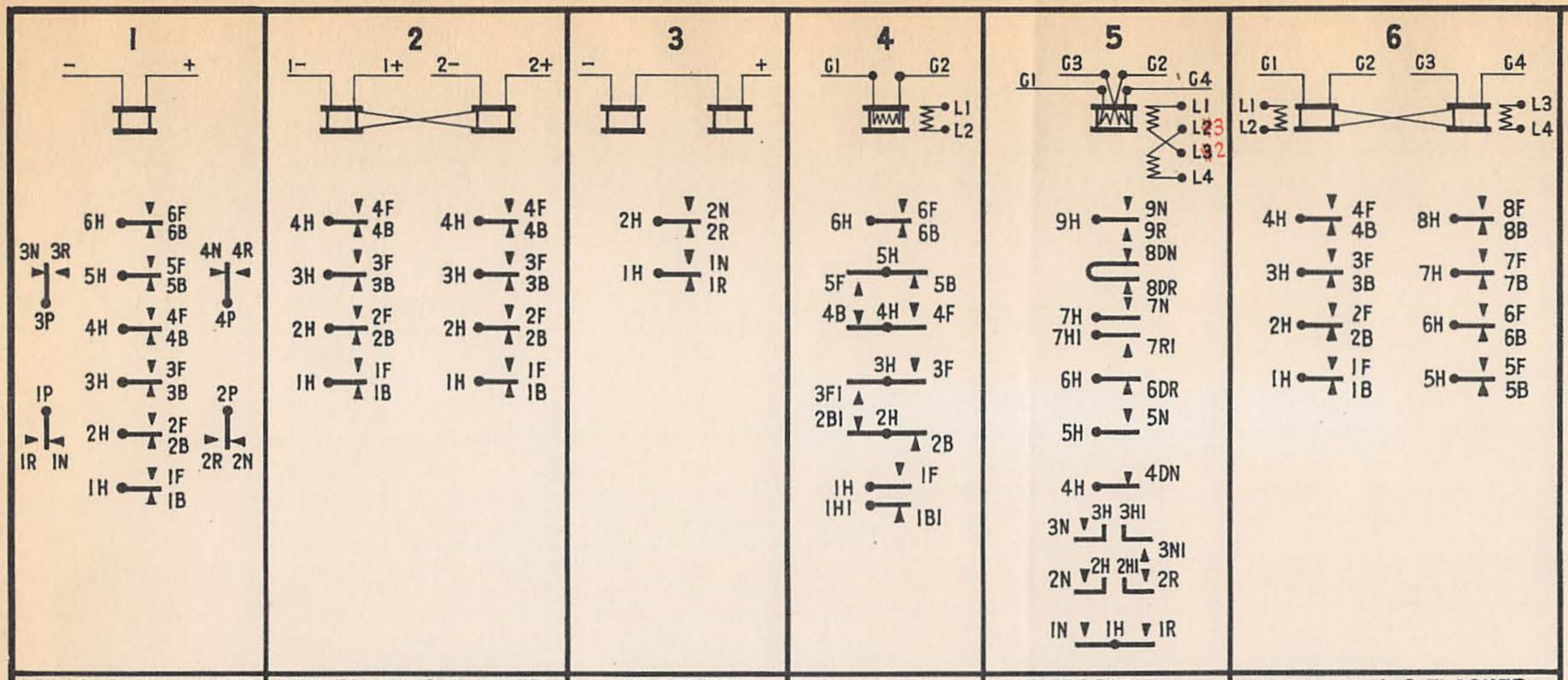
INSTRUCTIONS
NICKEL-IRON
STORAGE BATTERY
FLOATING CHARGE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R.

34

ISSUE	DATE
1	12-30-1933

Approved by Representatives of Lines shown.
J C Mock
Chairman


1
- +
6H 6F 6B
5H 5F 5B
4H 4F 4B
3H 3F 3B
2H 2F 2B
1H 1F 1B
3N 3R 3P
4N 4R 4P
1P 1R 1N
2P 2R 2N
2
1- 1+ 2- 2+
4H 4F 4B
3H 3F 3B
2H 2F 2B
1H 1F 1B
3
- +
2H 2N 2R
1H 1N 1R
4
G1 G2
L1 L2
6H 6F 6B
5H 5F 5B
4B 4H 4F
3H 3F 3F1
2B1 2H 2B
1H 1F
1H1 1B1
5
G1 G3 G2 G4
L1 L2 3 L3 2 L4
9H 9N 9R
8DN 8DR
7H 7H1 7N 7R1
6H 6DR
5H 5N
4H 4DN
3N 3H 3H1 3N1
2N 2H 2H1 2R
1N 1H 1R
6
G1 G2 G3 G4
L1 L2 L3 L4
4H 4F 4B
3H 3F 3B
2H 2F 2B
1H 1F 1B
8H 8F 8B
7H 7F 7B
6H 6F 6B
5H 5F 5B

NEUTRAL POLARIZED	INTERLOCKING FLASHER	FLASHER	2-POSITION	3-POSITION	INTERLOCKING FLASHER
D. C. RELAYS			A. C. RELAYS		

NOTES:

H = Heel.
F = Front Contact.
B = Back "
N = Normal "
R = Reverse "

P = Polar Contact.
C = A.C. Control.
L = A.C. Local.
D = Contact closed when relay is de-energized.

+ = Normally positive, right-hand coil terminal.
- = Normally negative, left-hand coil terminal.

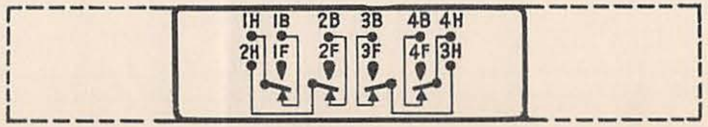
The number "1" used after H, F, B, N and R designates an additional independent contact in contact tier.

Numbering of contacts on all relays are from left to right.

Contact group of each relay shall be numbered consecutively from left to right when viewed from the front.

The contact groups shown represent contact arrangements used in various relays.

The "N" contacts of polarized relays are closed when relay is energized normally.


1H 1B 2B 3B 4B 4H
2H 1F 2F 3F 4F 3H

ETCHED
RELAY CONTACT POST DESIGNATION PLATE

(a) Minimum size for letters and figures of contact post designations to be 1/16 inch.
(b) Plate to be permanently attached to front of relay to allow clear vision of contact post designations and relay contacts.
(c) Plate may be of such dimensions as to include also serial number, manufacturers references, and other information.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

RELAY CONTACT POST DESIGNATIONS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
P. & L.E.R.R.
RUTL. R.R.

35

ISSUE	DATE
1	12-17-1930

Approved by Representatives of Lines Shown.
J C Mock
Chairman

RECEIPT OF SHIPMENT

1 Cells must be shipped to Storehouse or Installation Point in fully charged condition.

2 Cells must be unpacked carefully keeping them in upright position. Cells must not be lifted by terminals.

3 After unpacking, electrolyte in cells must be examined to determine that it is level with line on jar. If electrolyte is below line add distilled or approved water unless there is evidence of spillage, in which case add electrolyte, the specific gravity of which must be the same as that of other cells of same shipment. If water is added during freezing weather the cell must be given a charge to mix the water and electrolyte to prevent freezing.

4 Cells must not be allowed to stand idle for more than 30 days. They must be charged periodically or floated continuously at a rate which will maintain an approximate voltage of 2.15.

INSTALLATION AND MAINTENANCE

5 Before connecting cells all surfaces which are to be bolted together must be scraped bright and then coated with pure vaseline. Vaseline must also be applied to the studs of the bolt connectors. Cells must be connected with standard intercell connectors and care must be used to avoid having any strain on either connectors or terminals as a strain may eventually cause breakage. If the standard intercell connectors are not available rubber covered wire, not larger than No. 12 A.W.G. may be used. To hold the strands together when using stranded or flexible wire the eye must be soldered. After connections are made surplus vaseline must be wiped off.

6 A permanent number, preferably stenciled on rack, must be assigned to each cell.

7 Cells must be arranged so that the positive terminal of one cell adjoins the negative of the next. Cells must be so placed that edge of plates will be to the front.

8 Covers of cells must be separated from each other and from contact with sides of battery shelter. Cells must be held in place to prevent movement which may cause breakage of intercell connectors or battery terminals.

9 After all intercell connections are completed the voltage of each cell must be taken to determine that the positive terminal of each cell is connected to negative terminal of adjoining cell.

10 The specific gravity of the electrolyte of each cell must be tested to determine that it is within the limits of 1.190 to 1.230 at 70 deg. F. If the electrolyte in any cell is found to be below 1.190 at 70 deg. F. the cell must not be placed in service until given a complete charge.

To correct specific gravity readings for temperature variation subtract .001 for each 3 deg. below 70 deg. F. and add .001 for each 3 deg. above 70 deg. F.

11 Connections must be arranged so that the positive terminal of the rectifier or charging source will connect with the positive terminal of the battery. Direct current only must be used for charging.

12 After installation cells must be charged at the maximum rated output of the rectifier and this charging rate continued until cells are fully charged. The voltage and specific gravity (corrected for temperature) of each cell must be recorded each week during original charge on Battery Record Card, Form SC-27. Cells are fully charged when 3 equal consecutive voltage readings are obtained in excess of 2.25 volts per cell together with equal consecutive specific gravity readings equal to the recommended specific gravity for particular type of cell when fully charged.

At convenient intervals thereafter the output of the rectifier must be reduced in small steps until the voltage directly at the cell terminals generally stays between 2.10 and 2.20 volts. The voltage may vary below or above these limits according to traffic conditions, power interruptions or atmospheric temperature, but should not be continually above or below these limits except when the cell temperature is below 32 deg. F. the voltage may increase to 2.25 volts per cell in which case the charging rate should not be changed.

13 After original charge the voltage of each individual cell must be taken at least each month, or more frequently if required by special conditions and record on Storage Battery Record Card Form SC-27.

14 The voltmeter used must be kept in calibration.

15 If the battery is floating at approximately correct rate a slow stream of gas bubbles will be noted rising from the top corners of the outside negative plates, but large bubbles will not be gathering and breaking at the surface of the electrolyte. The positive plates will be dark brown in color.

16 Too frequent adjustments of rectifier outputs must not be made. It is unnecessary to take or record the output of the rectifier except in case of adjustment.

17 A lead plate storage battery requires a certain amount of current input to overcome loss of charge due to internal local action. This current input varies with the type and size of cell and with the temperature of the cell. As example a 120 ampere hour capacity battery (at the 8 hour rate) requires:

.050 Amp. at 50 Deg. F.	.112 Amp. at 80 Deg. F.
.066 Amp. at 60 Deg. F.	.160 Amp. at 90 Deg. F.
.088 Amp. at 70 Deg. F.	.220 Amp. at 100 Deg. F.

18 The capacity of lead storage batteries decreases with decrease of temperature of cell and batteries should be protected from extreme heat or cold, as a change from 100 deg. F. to 20 deg. F. will decrease capacity of battery 50 per cent. Due to this loss of capacity more frequent inspections to determine that battery is fully charged are necessary in cold weather.

19 Separators must be covered with electrolyte. For replacing evaporation distilled or approved water only must be used. It should be necessary if battery is floating properly to add water only twice a year, preferably in the early Fall and in the Spring to avoid the danger of water freezing during cold weather. If water must be added during freezing weather a syringe must be used to stir the entire solution so as to mix the water and electrolyte. When water is added the level of the electrolyte must be brought up to the level line on the side of the jar.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

35B

7-22-1939
9-30-1943

LEAD TYPE STORAGE BATTERY
SEALED GLASS JAR
FLOATING CHARGE
INSTRUCTIONS

Approved by Representatives of Lines shown.

Chairman

(CONT'D ON PAGE 2)

20 Electrolyte or acid must be added to replace some that is lost and then only on instructions from Signal Supervisor. Electrolyte of 1.210 specific gravity must be used. Electrolyte must be added only to replace spillage.

21 The specific gravity of the electrolyte with the cells fully charged should approximate the values recommended for that particular type and make of battery. Specific gravity readings must be taken once each 3 months, record on Storage Battery Card, Form SC-27.

22 If upon regular inspection voltage of battery is found to be lower than normal as indicated on record card, gravity reading of at least one cell of the battery must be taken and this reading compared with reading on record card when battery was in a fully charged condition. If found to be more than 25 points low procedure as outlined in instruction 12 must be followed.

23 Terminal nuts must be checked at intervals after installation to insure good tight connections.

24 Should it become necessary to refill sealing nut cups pure vaseline only must be used; ordinary animal or vegetable grease is harmful.

25 In case a battery becomes discharged to any appreciable extent the output of the rectifier must be increased to the maximum rating and procedure as outlined in instruction 12 must be followed.

It may be advisable to replace battery or employ rectifier of larger capacity.

Supervisor must be notified when a battery becomes fully discharged.

26 Battery, its connections and surrounding parts must be kept clean and dry. Vaseline must not be removed from the sealing nuts. Vent plugs must be kept in place and tight. If electrolyte is spilled, or surrounding parts are damp with acid, a solution of baking soda in the proportions of 1 lb. of soda to 1 gal. of water must be applied, after which the parts must be rinsed with water and dried.

The soda solution must not be allowed to get into the cells.

27 If terminals or connectors show evidence of corrosion the corroded surface must be scraped clean and then washed with soda solution after which a thin coating of vaseline must be applied. No corrosion will occur unless electrolyte is spilled and allowed to remain.

28 Soda solution or ammonia should be employed promptly to neutralize acid on clothing, cement, etc.

29 Water for electrolyte must be stored or transported only in receptacles provided, which receptacles must be kept clean and covered and not used for other purposes.

30 If a jar is broken and the element exposed to the air the element may be placed in a wooden tub or bucket, glass or earthenware container filled with distilled or approved water.

If the cell is to remain out of service longer than a week the element must be dismantled, the separators and negative groups kept in water and the positive groups thoroughly dried. For shipment the negative group must be thoroughly dried after washing in clear water.

31 To prepare groups for shipment wood blocks, the size of the plates and of a thickness equal to the distance between plates, must be inserted between the plates to prevent any strain on the plate lugs. The groups must be packed to prevent shifting. Sawdust or chips must not be used for packing.

32 As the cells give off gas care must be used to avoid electric sparks and keep open flame away from the battery in order to prevent an explosion. Sparks may be produced when using tools or from static discharge by contact with the body or otherwise.

SIGNAL AND TRAIN CONTROL COMMITTEE	35B
NEW YORK CENTRAL SYSTEM **LEAD TYPE STORAGE BATTERY** **SEALED GLASS JAR-FLOATING CHARGE**	7-22-1939 9-30-1943

(CONT'D ON PAGE____)

1 Head of Rail Type.
- (a) Mechanically applied rail head bonds of approved type must be used except where otherwise specified by Signal Engineer.
  - (1) Mechanically applied type
    The drilling must be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 6083.
  - (2) Welded type (Cadweld)
    Welded type rail head bonds as specified on N.Y.C.S., S. & T.C.C. Dwg. 6083 must be installed where it is not practicable to use mechanically applied rail head bonds.

2 Web of Rail Type.
- (a) Web of rail bonds and drilling as specified on N.Y.C.S., S. & T.C.C. Dwg. 1156 may be used in road crossings in combination with rail head type bonds, for bonding frog and switch points and may be used where rail head type bonds are not adaptable.

DRILLING AND PREPARATION OF RAILS FOR HEAD OF RAIL AND WEB OF RAIL BONDING

3 Head of Rail Drilling.
- (a) Three-eighth inch diameter twist drills, in accordance with A.A.R. Spec. 254-49, must be used for drilling bond holes.
- (b) Machine should be adjusted in accordance with manufacturer's instructions so that hole drilled will conform to N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (c) Indicator on machine, if so equipped, should be adjusted to locate hole or holes with respect to rail end.
- (d) Machine must be clamped on rail so that indicator point is in line with rail end before drilling hole or holes. Single spindle machine should be shifted on rail so that opposite indicator is in line with opposite rail end before clamping machine to drill second hole.
- (e) Machines provided with adjustable level should be adjusted in accordance with manufacturer's instructions.
- (f) Machine should be adjusted to rotate the drill, when under load, at a speed of 300 to 325 r.p.m. Speed should be checked occasionally with a speed indicator. If machine cannot be adjusted to operate at the proper speed, repairs to engine may be necessary.
- (g) Rail clamps must be kept in adjustment to insure that machine is securely clamped to rail while drilling is in progress.
- (h) Pressure should be applied on feed lever until depth stop comes in contact with rail head. This position can be observed and is indicated by speeding up of engine.
- (i) Holes must be drilled dry, chips removed, and checked frequently with plug gage A.A.R. Drawing 1048, for diameter and depth, and immediately after changing drill.
- (j) When drills are changed, machine must be readjusted as covered in Paragraph 3 (b).
- (k) Drills operating with good cutting efficiency should cut two equal shavings or chips with no excessive noise. Drills which do not cut a properly sized hole, or which do not cut efficiently, must not be used. Such drills must be resharpened on a precision grinder, before further use.

4 Web of Rail Drilling.
- (a) Holes should be drilled in the direction in which bond plug is to be driven.
- (b) Machine should be adjusted to drill hole in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
- (c) Machine should be operated in same manner as for drilling head of rail. Pressure on feed lever should be reduced when drill point perforates the opposite side of rail.

5 Preparation of Head of Rail for Welded Type Bond.
- (a) Head of rail, at point of application of bond, must be thoroughly cleaned with power driven grinding wheel or recommended rail cleaning tool to produce a bright metal surface.
- (b) If rail has collected oil or grease, it must be cleaned prior to grinding operation.
- (c) If grinding wheel collects oil or grease it must be refaced and thoroughly cleaned.

INSTRUCTIONS FOR INSTALLING BONDS

6 Installation of Head of Rail Mechanically Applied Type Bond.
- (a) Install bonds the same day holes are drilled.
- (b) Use ordinary 2½ lb. hammer and strike the pin, head or punch, squarely.
- (c) Three good blows will normally install the terminal. Additional blows should be given if the impact does not sound solid. Excessive pounding must be avoided.
- (d) Care should be used to see that the bonds, or bond sleeves are parallel to the splice bar.
- (e) Bonds must be coated with No-Ox-Id grease or equivalent after installation.
- (f) After rail ends of bonded joints are heat-treated or built up by welding, and after the rail has cooled to a temperature that will permit the holding of the bare hand on the rail ends, existing bonds should be removed and new bonds installed in accordance with N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (g) On single track drilling should be established by direction of heaviest tonnage.

7 Installation of Web of Rail Plug-Type Bond.
- (a) Installation shall be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
- (b) Install bonds the same day holes are drilled.
- (c) Plugs shall be driven through the web of rail to within 3/16 in. of the shoulder with a 2½ lb. hammer. Plug must be driven from same side hole is drilled.
- (d) Bonds may be coated with No-Ox-Id grease or equivalent after installation.

8 Installation of Welded Type (CADWELD) Head of Rail Bond.
- (a) Bonds must be applied while rail head is clean.
- (b) Welding powder must be kept dry and welding surfaces of rail and bond must be kept free of moisture.
- (c) Weld bond in place according to instructions furnished by the manufacturer and conforming to N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (d) Bonds must be coated with No-Ox-Id grease or equivalent after installation.

CARE OF BONDING MACHINES

9 Preparation of Machine for Use.
- (a) Before operating machine, it must be thoroughly cleaned and engine crank case, gear case and air cleaner must be filled to the proper level with the recommended oils.
- (b) Engine crank case and air cleaner must be kept filled to the required level at all times in accordance with manufacturer's instructions, using the approved SAE weight and grade of oil recommended for the prevailing temperature under which machine is to be operated.
- (c) Clean non-leaded gasoline should be used. Fuel tank must not be filled while engine is running. Avoid spilling gasoline on hot engine as this may cause an explosion and serious injury.
- (d) All moving parts should be lubricated in accordance with manufacturer's instructions.
- (e) Engine and all moving parts must be kept clean both inside and outside and protected so that no dirt or water enters crank case, air cleaner, fuel tank or gear case when opened for inspection or refilling.
- (f) When machine is off the rail, it must be placed so that drill bit, chuck and spindle housing will not come in contact with grit or dirt.
- (g) Machine should be kept adjusted in accordance with manufacturer's instructions.

10 Regular Servicing of Machine.
- (a) Engine crank case and air cleaner must be drained and refilled after each 25 hours of engine operation.
- (b) Gear case must be kept filled at all times with transmission grease of grade recommended by manufacturer, (or equivalent). It should be cleaned out with gasoline and refilled regularly, dependent upon use.

11 Storing of Machine.
- (a) Machines stored for any length of time should be completely drained of fuel to prevent gum deposits forming on essential parts such as the carburetor, fuel filter, fuel lines and fuel tank. The following action should be taken before storing:
  - (1) Remove filter bowl, open shutoff valve and drain fuel tank completely.
  - (2) Operate engine until it stops from exhaustion of fuel.
  - (3) Replace filter bowl.
  - (4) Leave shut-off valve open.
  - (5) Remove spark plug, pour not more than 1 ounce of SAE No. 20 oil into cylinder and crank engine slowly to spread oil. Replace spark plug.
  - (6) Exposed portion of spindle and other revolving parts must be protected in accordance with N.Y.C.S., S. & T.C.C. Instruction 350.
- (b) Machine must be stored in a weatherproof housing and covered with canvas to keep machine clean.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

36A
8-2-1950

INSTALLATION OF RAIL SIGNAL BONDS
INSTRUCTIONS

Approved by Representatives of lines shown.
Chairman.

Printed in U.S.A.

1 Head of Rail Type.
- (a) Mechanically applied rail head bonds of approved type must be used except where otherwise specified by Signal Engineer.
  - (1) Mechanically applied type
    The drilling must be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 6083.
  - (2) Welded type (Cadweld)
    Welded type rail head bonds as specified on N.Y.C.S., S. & T.C.C. Dwg. 6083 must be installed where it is not practicable to use mechanically applied rail head bonds.

2 Web of Rail Type.
- (a) Web of rail bonds and drilling as specified on N.Y.C.S., S. & T.C.C. Dwg. 1156 may be used in road crossings in combination with rail head type bonds, for bonding frog and switch points and may be used where rail head type bonds are not adaptable.

DRILLING AND PREPARATION OF RAILS FOR HEAD OF RAIL AND WEB OF RAIL BONDING

3 Head of Rail Drilling.
- (a) Three-eighth inch diameter twist drills, in accordance with A.A.R. Spec. 254-49, must be used for drilling bond holes.
- (b) Machine should be adjusted in accordance with manufacturer's instructions so that hole drilled will conform to N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (c) Indicator on machine, if so equipped, should be adjusted to locate hole or holes with respect to rail end.
- (d) Machine must be clamped on rail so that indicator point is in line with rail end before drilling hole or holes. Single spindle machine should be shifted on rail so that opposite indicator is in line with opposite rail end before clamping machine to drill second hole.
- (e) Machines provided with adjustable level should be adjusted in accordance with manufacturer's instructions.
- (f) Machine should be adjusted to rotate the drill, when under load, at a speed of 300 to 325 r.p.m. Speed should be checked occasionally with a speed indicator. If machine cannot be adjusted to operate at the proper speed, repairs to engine may be necessary.
- (g) Rail clamps must be kept in adjustment to insure that machine is securely clamped to rail while drilling is in progress.
- (h) Pressure should be applied on feed lever until depth stop comes in contact with rail head. This position can be observed and is indicated by speeding up of engine.
- (i) Holes must be drilled dry, chips removed, and checked frequently with plug gage A.A.R. Drawing 1048, for diameter and depth, and immediately after changing drill.
- (j) When drills are changed, machine must be readjusted as covered in Paragraph 3 (b).
- (k) Drills operating with good cutting efficiency should cut two equal shavings or chips with no excessive noise. Drills which do not cut a properly sized hole, or which do not cut efficiently, must not be used. Such drills must be resharpened on a precision grinder, before further use.

4 Web of Rail Drilling.
- (a) Holes should be drilled in the direction in which bond plug is to be driven.
- (b) Machine should be adjusted to drill hole in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
- (c) Machine should be operated in same manner as for drilling head of rail. Pressure on feed lever should be reduced when drill point perforates the opposite side of rail.

5 Preparation of Head of Rail for Welded Type Bond.
- (a) Head of rail, at point of application of bond, must be thoroughly cleaned with power driven grinding wheel or recommended rail cleaning tool to produce a bright metal surface.
- (b) If rail has collected oil or grease, it must be cleaned prior to grinding operation.
- (c) If grinding wheel collects oil or grease it must be refaced and thoroughly cleaned.

INSTRUCTIONS FOR INSTALLING BONDS

6 Installation of Head of Rail Mechanically Applied Type Bond.
- (a) Install bonds the same day holes are drilled.
- (b) Use ordinary 2½ lb. hammer and strike the pin, head or punch, squarely.
- (c) At least 3 or 4 solid blows with a 2 to 2½ lb. hammer are required. 1 or 2 additional blows will not be injurious.
- (d) Care should be used to see that the bonds, or bond sleeves are parallel to the splice bar.
- (e) Bonds must be coated with No-Ox-Id grease or equivalent after installation.
- (f) After rail ends of bonded joints are heat-treated or built up by welding, and after the rail has cooled to a temperature that will permit the holding of the bare hand on the rail ends, existing bonds should be removed and new bonds installed in accordance with N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (g) On single track drilling should be established by direction of heaviest tonnage.

7 Installation of Web of Rail Plug-Type Bond.
- (a) Installation shall be in accordance with N.Y.C.S., S. & T.C.C. Dwg. 1156.
- (b) Install bonds the same day holes are drilled.
- (c) Plugs shall be driven through the web of rail to within 3/16 in. of the shoulder with a 2½ lb. hammer. Plug must be driven from same side hole is drilled.
- (d) Bonds may be coated with No-Ox-Id grease or equivalent after installation.

8 Installation of Welded Type (CADWELD) Head of Rail Bond.
- (a) Bonds must be applied while rail head is clean.
- (b) Welding powder must be kept dry and welding surfaces of rail and bond must be kept free of moisture.
- (c) Weld bond in place according to instructions furnished by the manufacturer and conforming to N.Y.C.S., S. & T.C.C. Dwg. 6083.
- (d) Bonds must be coated with No-Ox-Id grease or equivalent after installation.

CARE OF BONDING MACHINES

9 Preparation of Machine for Use.
- (a) Before operating machine, it must be thoroughly cleaned and engine crank case, gear case and air cleaner must be filled to the proper level with the recommended oils.
- (b) Engine crank case and air cleaner must be kept filled to the required level at all times in accordance with manufacturer's instructions, using the approved SAE weight and grade of oil recommended for the prevailing temperature under which machine is to be operated.
- (c) Clean non-leaded gasoline should be used. Fuel tank must not be filled while engine is running. Avoid spilling gasoline on hot engine as this may cause an explosion and serious injury.
- (d) All moving parts should be lubricated in accordance with manufacturer's instructions.
- (e) Engine and all moving parts must be kept clean both inside and outside and protected so that no dirt or water enters crank case, air cleaner, fuel tank or gear case when opened for inspection or refilling.
- (f) When machine is off the rail, it must be placed so that drill bit, chuck and spindle housing will not come in contact with grit or dirt.
- (g) Machine should be kept adjusted in accordance with manufacturer's instructions.

10 Regular Servicing of Machine.
- (a) Engine crank case and air cleaner must be drained and refilled after each 25 hours of engine operation.
- (b) Gear case must be kept filled at all times with transmission grease of grade recommended by manufacturer, (or equivalent). It should be cleaned out with gasoline and refilled regularly, dependent upon use.

11 Storing of Machine.
- (a) Machines stored for any length of time should be completely drained of fuel to prevent gum deposits forming on essential parts such as the carburetor, fuel filter, fuel lines and fuel tank. The following action should be taken before storing:
  - (1) Remove filter bowl, open shutoff valve and drain fuel tank completely.
  - (2) Operate engine until it stops from exhaustion of fuel.
  - (3) Replace filter bowl.
  - (4) Leave shut-off valve open.
  - (5) Remove spark plug, pour not more than 1 ounce of SAE No. 20 oil into cylinder and crank engine slowly to spread oil. Replace spark plug.
  - (6) Exposed portion of spindle and other revolving parts must be protected in accordance with N.Y.C.S., S. & T.C.C. Instruction 350.
- (b) Machine must be stored in a weatherproof housing and covered with canvas to keep machine clean.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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P.&L.E.R.R.

36B

8- 2-1950
6-17-1952

INSTALLATION OF RAIL SIGNAL BONDS
INSTRUCTIONS

Approved by Representatives of lines shown.

Chairman.

Printed in U.S.A.

GENERAL

1. The installation shall be maintained in accordance with applicable plans and instructions.

2. Signs, lenses, and reflectors must be kept clean and intact.

3. Incandescent electric lamps shall be as per Plan 750 unless otherwise authorized by the Signal Engineer.

4. Wires and tags must be so arranged as to not interfere with operating parts of apparatus.

5. Doors, covers, and fastenings must be kept in good condition with suitable gaskets in place to keep out moisture and dirt.

6. Ventilators, when in use, must be kept clean to allow free circulation of air.

7. Painting shall be in accordance with Instruction 350.

8. Operation of highway crossing protection shall be checked in accordance with current instructions.

9. Proper precautions must be taken before changes or interruptions are made in track or other circuits affecting operation of crossing protection systems.

10. After repairs, adjustments or replacements, mechanism must be operated to full normal and full reverse position to see that it operates properly.

LUBRICATION

11. Avoid using too much oil. Always remove all surplus. All principal bearings, except those for the sidewalk gate shaft are either ball or roller type and need very little lubrication. Friction clutches on the motor armature shaft should always be kept free from oil.

12. *Motor Bearings* have oil fitting and should be lubricated every six months with a few drops of light oil per N.Y.C.S., Spec. 1206, Class 20, Grade A.

13. *Intermediate Gear Shaft Bearings*

    (a) W.R.S. Co. Type 3566 mechanism (Type B)
    Lubricate every six months through pressure fittings with Texas Company's Low Temp. 67 lubricant.

    (b) W.R.S. Co. Type 3562 or 3563 mechanism (Type 2A).
    Lubricate every three months with Spec. 1206, Class 20, Grade A oil.

    (c) W.R.S. Co. Type 3564 mechanism.
    Lubricate every six months through oil fittings with a few drops of oil per Spec. 1206 Class 20, Grade A.

14. *Roadway Gate and Sidewalk Gate Shaft Bearings* shall be filled with Texas Company's Low Temp. 67 lubricating grease every three to six months.

15. *Gear Teeth* shall be lubricated with Texas Company's Low Temp. 67 lubricating grease.

16. *Circuit Controller Cam Surfaces* of the W.R.S. Co. Type 3564 mechanism shall be lubricated with Texas Company's Low Temp. 67 lubricating grease every three to six months. In addition, the draglink pin, spring bolt, and guiding surfaces of the Drag Segment Cam should be lubricated with light oil per N.Y.C.S., Spec. 1206, Class 20, Grade A.

17. *Centrifugal brake* on W.R.S. Type 3562 and 3563 mechanism shall have a few drops of Spec. 1206, Class 20, Grade A oil applied to bearing supporting rollers. Texas Co. Low Temp. 67 grease shall be applied to slot in arms with a small stick.

18. *Hold Clear Device*

    (a) W.R.S. Co. Type 3562—3563—3566 mechanisms.

    Every three to six months lubricate the various pin supports in the locking pawl link and the oil holes in the armature support with N.Y.C.S., Spec. 1206, Class 20, Grade A oil. Lubricate hold-clear disc by holding a cloth moistened with oil against it while it rotates clockwise. Do not lubricate excessively.

    (b) W.R.S. Co. Type 3564 Mechanism.

    The trunnions for the moving parts of the assembly and the hold-clear pawl should have no more lubrication than is obtained by wiping with a cloth moistened with Spec. 1206, Class 20, Grade A oil. This should be done every three to six months.

ADJUSTMENTS

19. Gate arm torque and mechanism adjustments shall be in accordance with manufacturers' current instructions.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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P.&L.E.R.R.

37A
2-13-1951

HIGHWAY CROSSING FLASHING LIGHT SIGNALS AND ELECTRICALLY OPERATED GATES
MAINTENANCE INSTRUCTIONS

Approved by Representatives of lines shown.
Chairman.

(Printed in U.S.A.)

RECEIVED
JUN 16 1952
SPECIFICATION DEPT.

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE №____

Manuf.__________ Style Model }__________ Class Form }_____

Dwg. No. ______ Group List }____ Spec'n.________ Cycles_____

Service______________ Element________ Position_____

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:______________________________

____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE №____

Manuf.__________ Style Model }__________ Class Form }_____

Dwg. No. ______ Group List }____ Spec'n.________ Cycles_____

Service______________ Element________ Position_____

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:______________________________

____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE №____

Manuf.__________ Style Model }__________ Class Form }_____

Dwg. No. ______ Group List }____ Spec'n.________ Cycles_____

Service______________ Element________ Position_____

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:______________________________

____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE №____

Manuf.__________ Style Model }__________ Class Form }_____

Dwg. No. ______ Group List }____ Spec'n.________ Cycles_____

Service______________ Element________ Position_____

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:______________________________

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PURCHASE

Relays shall be purchased in accordance with A. R. A. Signal Section Specification, except as modified by the N. Y. C. Lines Signal Committee Instructions—*Alternating Current Relays and Indicators*—Reference being made to A. C. Relay Requirement Table, Form S. C. 20 for the Type of Relay required.

COILS

1 When in place, coils shall be fixed to prevent vibration.

TERMINAL CONNECTION

2 Relay coil terminal posts shall be marked plus (+) and minus (−), respectively, so that with energy applied and polarity as indicated, contacts will close:

(a) 2-Position relays, normal or front.

(b) 3-Position and polyphase relays, normal or upper.

(c) Vane type relays, normal or contacts nearest name plate.

FLEXIBLE CONDUCTOR

3 Flexible conductor connecting binding post and contact finger shall be formed and attached so as not to affect the Pick-up or Drop-away. The conductor shall be capable of carrying 10 Amperes continuously without injury.

NUTS AND SCREWS

4 Nuts and screws be securely locked.

CONTACTS

5 Metal contacts shall be of silver.

6 Finger contacts shall meet contact surfaces squarely and simultaneously.

7 Finger contact shall have a contact slide movement of not less than .010 in. on contact surfaces.

8 Metal support of non-fusible contact element shall be not less than $\frac{1}{16}$ in. from the contact surface.

9 Opening between finger contact and back contact surface of 2-position relays with front contact just closed shall be not less than .025 in.

10 Opening between finger contact and contact surface, with relay in de-energized position, shall be not less than .050 in.

11 Opening between de-energized finger contact and contact surface of 3-position relays with normal or reverse contacts just closed shall be not less than .015 in.

CONTACT RESISTANCE

12 Cleaned contact resistance with working current or voltage applied to coils shall not exceed the following:

(a) Silver to silver, 0.03 Ohms.

(b) Silver to carbon, 0.20 "

(c) Silver gauze to carbon, 0.16 "

(d) Carbon to carbon, 0.50 "

END PLAY

13 End play of moving elements supported by bearings shall be not less than .010 in. and not more than .020 in.

CLEARANCE

14 All moving parts except bearings and contacts, shall, under the most unfavorable conditions of end play and relative position of parts in the assembled relay, be separated by not less than the following minimum clearances:

SINGLE ELEMENT:	Rotor Type	Vane Type
(a) Radial,	.020 in.	.020 in.
(b) Longitudinal,	.025 in.	.017 in.
TWO ELEMENT:		
(c) Radial,	.020 in.	.025 in.
(d) Longitudinal,	.025 in.	.022 in.

15 Case shall be so fixed to insure a minimum clearance of $\frac{1}{8}$ in. between it and movable parts.

GASKET

16 Defective gaskets shall be replaced.

STOCK SHIPMENTS

17 Relays shall be tested and meet shop requirements immediately before shipment.

METERS

18 Shall be as specified.

19 Meters for shop use shall be calibrated by-monthly and for field use before each cycle of test or as often as necessary.

SEALING

20 Relay Case shall be sealed.

PACKING

21 Relays of the vane type must have vanes secured with mattress twine to prevent vibration of contacts during shipment.

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

INSTRUCTIONS

A.C. RELAYS AND INDICATORS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

40

JAN 31' 1930

Approved by Representatives of Lines Shown.

J C Mock
Chairman

(CONT'D ON PAGE 2)

22 Each relay must be placed in separate carton or suitably wrapped before being placed in packing boxes.

METHODS OF TESTS

23 Methods for making pick-up, working, drop-away and phase angle tests of various types of relays are shown on Page 4, Figs. 1 to 8 inclusive.

24 The method of test as shown in Fig. 1 provides for a phase angle between currents in the local and track or line windings of the relay, approximately equal to the phase angle between the voltage and current of the local winding. This shall be known as the test phase angle of the relay and these values may be translated to any phase angle desired by multiplying by proper factor obtained from curves shown on Page 4, Fig. 8.

25 Pick-up and drop-away tests must also be made with relay tilted to just take up end play in each direction to determine whether there is excess friction and the values so obtained must closely check with those taken with relay in normal position.

26 Pick-up, working, and drop-away must be determined in sequence as follows:

PICK-UP

27 Apply energy to coils and slowly and gradually increase until the front or energized contacts just close. This value shall be the pick-up.

WORKING

28 After determining pick-up values, continue to slowly and gradually increase the energy until the moving element just strikes stop. This value shall be the working.

DROP-AWAY

29 After determining the working value, slowly and gradually reduce the energy until the back contacts of 2-position relays are just closed or until the de-energized contacts of 3-position relays are just closed. If there are no back or de-energized contacts the energy should be reduced until the moving element assumes its de-energized position. This value shall be the drop-away.

30 When testing for pick-up and drop-away values, Par. 27 and 29, determine that the relay operates without retardation of movement due to friction or external force.

31 Tests for pick-up, working, and drop-away values of 3-position relays must be made in normal and reverse directions.

32 Tests of 2-element relays must be made with rated voltage on local element or corrections must be made to readings taken on line or track element.

SHOP REPAIRS

33 Test relays for open circuits and short circuits in windings, resistors and condensers by impressing the working voltage on each element and observing that current is normal. Insulation resistance between windings and between all current carrying parts and case should be infinity as measured by megger. Record any irregular conditions found and give special attention to defects noted on repair tag, Form S. C. 9.

34 Make repairs and adjustments as follows:

35 Relays shall be disassembled and the bearings alternately washed in high test gasoline until clean, and dried with clean dry air, not to exceed 5 lbs. pressure. Ball bearings must then be shaken to see that the balls are free and a pointed instrument used to revolve balls in race to see that they move freely in both directions. Jewel bearings shall be inspected under magnifying glass for defects and foreign matter.

36 Stator shall be cleaned between pole pieces and coils with a suitable tool and compressed air to remove excess impregnation compound and all foreign matter to a depth of not less than .015 in. Rusty surfaces on laminations shall be cleaned until free from rust and immediately coated with "Zapon" Lacquer No. 14.

37 Rotor pinion and shaft bearing shall be washed with clean gasoline and thoroughly dried with cloth free from lint or dust.

38 The rotor shaft shall be examined for worn or pitted bearing surfaces and point. The rotor shall then be tested by revolving in rack to determine that it runs true.

39 All shafts and bearings must be cleaned and examined for worn parts.

40 All worn and defective parts shall be replaced and defective parts scrapped. Repair parts must be carefully inspected and tested before being used.

41 Pinion gear shall slip at not less than 4-inch ounces or more than 7-inch ounces.

42 The surfaces of friction discs, where the friction clutch spring presses against disc, must be examined

(CONT'D ON PAGE 3)

to determine that spring has not cut or roughened disc surface. Friction clutch springs having ends turned over to fit in the collar or disc must be scrapped and replaced with springs, having ends ground to give full bearing surface against collar or disc.

43 Sector shall be washed with clean gasoline, examined for worn teeth and the contour of teeth gauged for alignment and proper length.

44 Sectors after being tested shall be assembled in the well and checked for end play and clearance of counter-weight.

45 Rivets attaching counter-weight arm to sector shall be of steel.

46 Contacts must be cleaned, replacing any that may be pitted, burned or otherwise defective.

47 The link connecting contact bar with sector must be moved backward and forward by hand to check for friction.

SHOP TESTS

48 Relay operating requirements must be in accordance with Table, Form S. C. 20.

49 Tests, as required by Forms S. C. 19 and S. C. 22 must be made and recorded at time relay is tested. Pick-up and drop-away tests must also be made with relay tilted to just take up end play in each direction to determine whether there is excess friction and the values so obtained must closely check with those taken with relay in normal position.

50 Contacts of relays must be tested for contact resistance after case is in place and before relay is sealed and must meet contact resistance requirements.

51 Insulation tests must be made between windings and between all current carrying parts and case and the insulation should be infinity as measured by megger.

SHOP INSPECTION

52 Determine by actual operation that relay has a positive drop-away and relay contacts open without retardation of movement due to friction or external force.

53 Before case is closed, determine that each part to be enclosed is free from foreign matter, in proper position and in good condition.

FIELD TESTS

54 Tests, as required by Paragraphs 27, 28 and 29 and by form S. C. 19 must be made annually.

FIELD INSPECTION

55 It must be determined by observation that sufficient contact opening exists between front and back contacts on 2-position relays and between normal and reverse and de-energized contacts on 3-position relays.

56 Relays not meeting field requirements must be taken out of service promptly.

57 Relays shall meet shop requirements when placed in service except in emergency when relays meeting field requirements may be used.

58 Determine by observing operation of relay, that sufficient clearance exists between case and movable parts.

59 Parts enclosed shall be free from foreign matter, in proper position and in good condition.

60 Emergency repairs and adjustments to insure positive operation of relay for temporary use, may be made in the field.

RECORDING

61 Office records must be filed in groups, indexed according to location in order of mileage direction.

62 Relay records of an interlocking must be filed under index card for that location.

63 Relay records of Automatic signal territory must be indexed for the territory between points designated.

64 Relays shall be identified by serial number which shall be recorded. Manufacturer's serial number must be used if available.

65 Inspectors must re-mark indistinct serial numbers.

66 Relays that have illegible or no serial number shall be assigned serial number. The serial number shall be preceded by a letter which shall be assigned by the Signal Engineer.

67 Inspectors must immediately record field readings on Form S. C. 19 which must be forwarded to office designated by Signal Engineer.

68 Field readings must be transferred from Form S. C. 19 to Form S. C. 22. One Form S. C. 22 must be used for each relay or electrical instrument.

69 When relays are removed or installed, record shall be made on Form S. C. 21 and forwarded to office designated by Signal Engineer.

70 Normal and reverse readings on Forms S. C. 18, 19, 21 and 22 shall be recorded on separate lines.

(CONT'D ON PAGE 4)

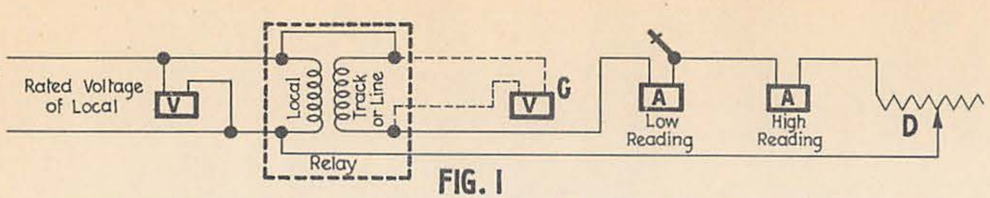

Rated Voltage of Local
V
Local
Track or Line
Relay
V
C
A
Low Reading
A
High Reading
D

FIG. 1

SERIES RESISTANCE METHOD FOR TWO-CIRCUIT RELAYS—ROTOR TYPE AND VANE TYPE RELAYS
Notes: 1-2-3-4-5-6

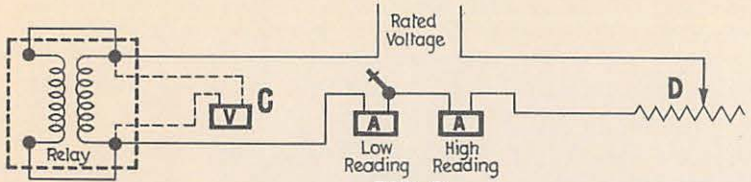

Rated Voltage
Relay
V
C
A
Low Reading
A
High Reading
D

FIG. 2

SERIES RESISTANCE METHOD FOR SINGLE CIRCUIT RELAYS
Notes: 2-3-4-5-6

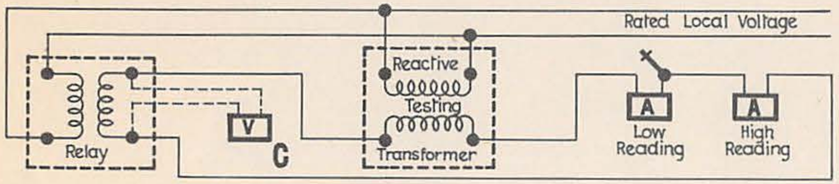
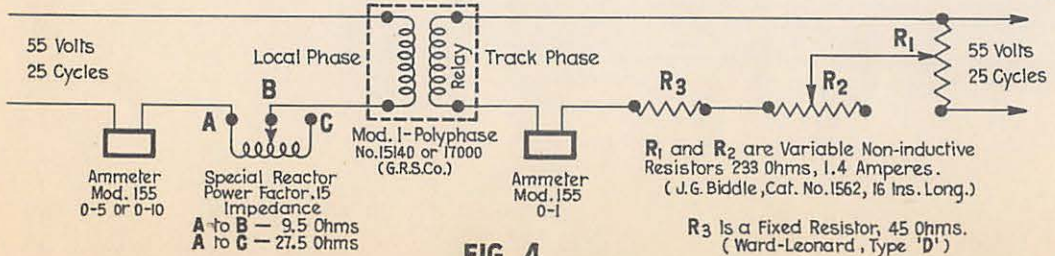

Rated Local Voltage
Relay
V
C
Reactive
Testing
Transformer
A
Low Reading
A
High Reading

FIG. 3

REACTIVE TESTING TRANSFORMER METHOD FOR CENTRIFUGAL RELAYS AND FOR VANE TYPE TRACK RELAYS WITH CONDENSERS AND ROTOR TYPE RELAYS WITH HIGH POWER FACTOR LOCALS
Notes: 1-2-3-5-6


55 Volts
25 Cycles
Local Phase
Relay
Track Phase
B
A
C
Ammeter Mod. 155 0-5 or 0-10
Special Reactor Power Factor .15 Impedance
A to B — 9.5 Ohms
A to C — 27.5 Ohms
Mod. 1-Polyphase No. 15140 or 17000 (G.R.S.Co.)
Ammeter Mod. 155 0-1
R3
R2
R1
55 Volts
25 Cycles

R1 and R2 are Variable Non-inductive Resistors 233 Ohms, 1.4 Amperes. (J.G. Biddle, Cat. No. 1562, 16 Ins. Long.)

R3 is a Fixed Resistor, 45 Ohms. (Ward-Leonard, Type 'D')

FIG. 4

METHODS OF TESTING (G.R.S.Co.) POLYPHASE RELAYS— MODELS 15140 OR 17000
Notes: 7-8

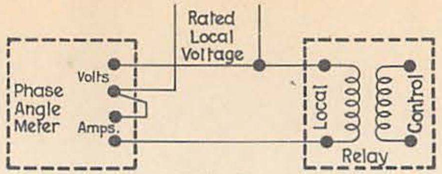

Rated Local Voltage
Phase Angle Meter
Volts
Amps.
Local
Control
Relay

FIG. 5

PHASE ANGLE BETWEEN LOCAL VOLTAGE AND LOCAL CURRENT
Note: 9

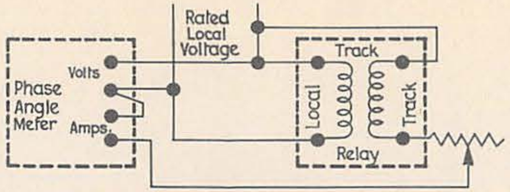

Rated Local Voltage
Phase Angle Meter
Volts
Amps.
Track
Local
Track
Relay

FIG. 6

PHASE ANGLE BETWEEN LOCAL VOLTAGE AND TRACK CURRENT
Note: 9

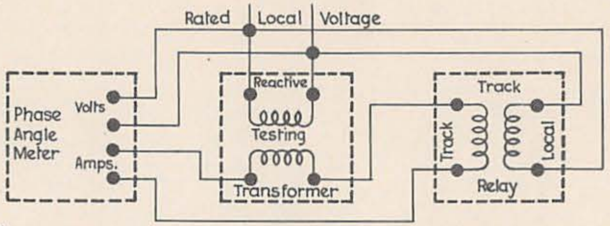

Rated Local Voltage
Phase Angle Meter
Volts
Amps.
Reactive
Testing
Transformer
Track
Track
Local
Relay

FIG. 7

PHASE ANGLE BETWEEN LOCAL VOLTAGE AND TRACK CURRENT WHEN TESTING WITH A REACTIVE TESTING TRANSFORMER
Note: 9

PHASE ANGLE METER METHODS
(Figs. 5-6-7)

NOTES:

1 — Relay track wires to be disconnected while making tests.

2 — Volt-meter 'G' must not be in circuit when current readings are taken.

3 — Volt-meter 'G' used for taking voltage readings on line relays.

4 — Where track or line element consists of two windings arranged for individual external connections they shall be connected in series for test. Where local element consists of two windings arranged for individual external connections they shall be connected in series for test.

5 — Where rated voltage of local is less than 55, use 110 Volts (Normal) for testing track or line element.

6 — Graded resistance 'D' wound on 2.5 in. non-metalic tubing 20 ins. long. The resistance and capacity of the graded sections should be as follows:

	Length of Section.	Capacity.	Resistance of Section.	Total Resistance.
1	3 Ins.	2.3 Amps.	38 Ohms	38 Ohms
2	3 "	1.6 "	73 "	111 "
3	3 "	0.7 "	291 "	402 "
4	3 "	0.3 "	1,066 "	1,468 "
5	6 "	0.1 "	10,000 "	11,468 "

7 — When testing relays with 1.6 Volt local (Stator 21829 or 39890) connect to taps **A—B** on reactor and adjust the air gap until the current is 5.75 Amperes.

8 — When testing relays with 14 Volt local (stator 17008) connect to taps **A—C** on reactor and adjust the air gap until the current is 1.75 Amperes.

9 — Phase angle meter used is a Weston Model No. 480 having voltage taps 0-15 V., 0-60 V. and 0-120 V. and for 25 or 60 cycle current.

10 — Curve showing relation between required and ideal operating values of Two Element Relays when phase relations differ from ideal adjustment.

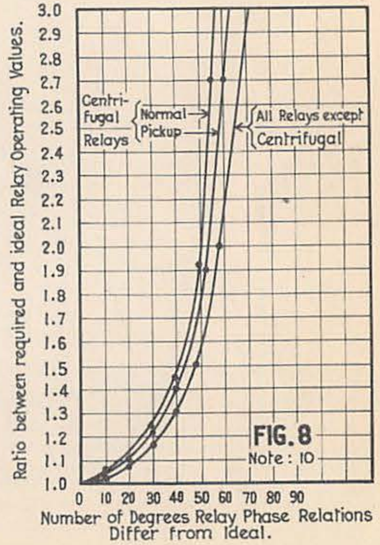


FIG. 8
Note: 10

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(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 1

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No 36100 Group/List 85 Spec'n. 10AB-3R Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

Front (d) 2 (i) 2 Back (d) 2 (i)_____

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.147		.162	
	Amps.	.230		.253	
PICK-UP (Min.)	Volts	.122		.110	
	Amps.	.190		.171	
WORKING (Max.)	Volts	.212		.233	
	Amps.	.330		.363	
WORKING (Min.)	Volts	.154		.139	
	Amps.	.240		.216	
DROP-AWAY (Min.)	Volts	.066		.059	
	Amps.	.104		.094	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55		50	

REMARKS: Split Phase

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 2

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group/List 101 Spec'n. ________ Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

Front (d) 2 (i)___ Back (d) 2 (i)_____

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.147		.162	
	Amps.	.230		.253	
PICK-UP (Min.)	Volts	.122		.110	
	Amps.	.190		.171	
WORKING (Max.)	Volts	.192		.211	
	Amps.	.300		.330	
WORKING (Min.)	Volts	.140		.126	
	Amps.	.220		.198	
DROP-AWAY (Min.)	Volts	.066		.059	
	Amps.	.104		.094	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55		50	

REMARKS: ____________

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 3

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group/List 102 Spec'n. ________ Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

Front (d)___(i) 6 Back (d)___(i) 2

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.147		.162	
	Amps.	.230		.253	
PICK-UP (Min.)	Volts	.122		.110	
	Amps.	.190		.171	
WORKING (Max.)	Volts	.230		.253	
	Amps.	.360		.396	
WORKING (Min.)	Volts	.167		.150	
	Amps.	.262		.236	
DROP-AWAY (Min.)	Volts	.066		.059	
	Amps.	.104		.094	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55		50	

REMARKS: ____________

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 4

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group/List 1 Spec'n. 13G-44R Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

Front (d) 2 (i) 4 Back (d) 2 (i)_____

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.250		.275	
	Amps.	.390		.429	
PICK-UP (Min.)	Volts	.198		.179	
	Amps.	.310		.279	
WORKING (Max.)	Volts	.330		.363	
	Amps.	.516		.567	
WORKING (Min.)	Volts	.264		.238	
	Amps.	.412		.371	
DROP-AWAY (Min.)	Volts	.132		.119	
	Amps.	.206		.186	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		62		56	

REMARKS: ____________

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(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 5

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group List ____ Spec'n. L-12 Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___ (i)___ Reverse (d)___ (i)___

CONTACTS Front (d) 2 (i) 2 Back (d) 2 (i)___

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	130.	1.0
Amperes	.118	.80
Volt-Amperes	15.3	.80
Watts	10.25	.612
Power Factor	.67	.765
Impedance (Ohms)	1100.	1.25
Phase Angle of Element	48°	40°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.39		.40	
	Amps.	.31		.32	
PICK-UP (Min.)	Volts	.31		.30	
	Amps.	.25		.24	
WORKING (Max.)	Volts	.54		.56	
	Amps.	.43		.45	
WORKING (Min.)	Volts	.39		.375	
	Amps.	.31		.30	
DROP-AWAY (Min.)	Volts	.175		.16	
	Amps.	.14		.13	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		55		50	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 6

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group List 1 Spec'n. 13G-8R Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___ (i)___ Reverse (d)___ (i)___

CONTACTS Front (d) 4 (i)___ Back (d) 4 (i)___

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	
Amperes	.245	
Volt-Amperes	27.	
Watts	16.9	
Power Factor	.65	
Impedance (Ohms)	450.	
Phase Angle of Element	48°	

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.320		.320	
PICK-UP (Min.)	Volts				
	Amps.	.280		.280	
WORKING (Max.)	Volts				
	Amps.	.370		.370	
WORKING (Min.)	Volts				
	Amps.	.275		.275	
DROP-AWAY (Min.)	Volts				
	Amps.	.160		.140	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		120		120	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		55		50	

REMARKS: Service – D.C. Traction – Double Rail.

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 7

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36100 Group List 1 Spec'n. 13G-177R Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d)___ (i)___ Reverse (d)___ (i)___

CONTACTS Front (d)___ (i) 4 Back (d)___ (i) 2

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	
Amperes	.245	
Volt-Amperes	27.	
Watts	16.9	
Power Factor	.65	
Impedance (Ohms)	450.	
Phase Angle of Element	48°	

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.115		.115	
PICK-UP (Min.)	Volts				
	Amps.	.090		.090	
WORKING (Max.)	Volts				
	Amps.	.165		.165	
WORKING (Min.)	Volts				
	Amps.	.100		.100	
DROP-AWAY (Min.)	Volts				
	Amps.	.052		.047	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		55		50	

REMARKS: Service – Steam Road – Double Rail.

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 8

Manuf. ______ Style/Model ______ Class/Form ______

Dwg. No. ______ Group List ___ Spec'n. ______ Cycles ______

Service ______ Element ______ Position ______

CONTACTS Normal (d)___ (i)___ Reverse (d)___ (i)___

CONTACTS Front (d)___ (i)___ Back (d)___ (i)___

De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ______

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 9

Manuf. ________ Style / Model ________ Class / Form ____

Dwg. No. ______ Group List ____ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position _____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ × 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 10

Manuf. ________ Style / Model ________ Class / Form ____

Dwg. No. ______ Group List ____ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position _____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ × 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 11

Manuf. ________ Style / Model ________ Class / Form ____

Dwg. No. ______ Group List ____ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position _____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ × 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 12

Manuf. ________ Style / Model ________ Class / Form ____

Dwg. No. ______ Group List ____ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position _____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ × 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

(CONT'D ON PAGE 8)

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 13

Manuf. G.R.S.Co. Style/Model 2 Class/Form A
Dwg. No. 36103 Group/List 1 Spec'n. 13G-88R Cycles 60
Service Track Element 2 Position 3
CONTACTS Normal (d) 5 (i) ___ Reverse (d) 5 (i) ___
Front (d) ___ (i) ___ Back (d) ___ (i) ___
De-energized 1

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.160	.160	.176	.176
	Amps.	.250	.250	.275	.275
PICK-UP (Min.)	Volts	.141	.141	.127	.127
	Amps.	.220	.220	.198	.198
WORKING (Max.)	Volts	.240	.240	.264	.264
	Amps.	.375	.375	.413	.413
WORKING (Min.)	Volts	.190	.190	.171	.171
	Amps.	.297	.297	.268	.268
DROP-AWAY (Min.)	Volts	.088	.088	.075	.075
	Amps.	.130	.130	.117	.117
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150	150	150	150
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55	55	50	50

REMARKS:

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 14

Manuf. G.R.S.Co. Style/Model 2 Class/Form A
Dwg. No. 36103 Group/List 1 Spec'n. 13G-79R Cycles 60
Service Track Element 2 Position 3
CONTACTS Normal (d) 6 (i) ___ Reverse (d) 6 (i) ___
Front (d) ___ (i) ___ Back (d) ___ (i) ___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.160	.160	.176	.176
	Amps.	.250	.250	.275	.275
PICK-UP (Min.)	Volts	.141	.141	.127	.127
	Amps.	.220	.220	.198	.198
WORKING (Max.)	Volts	.240	.240	.264	.264
	Amps.	.375	.375	.413	.413
WORKING (Min.)	Volts	.190	.190	.171	.171
	Amps.	.297	.297	.268	.268
DROP-AWAY (Min.)	Volts	.083	.083	.075	.075
	Amps.	.130	.130	.117	.117
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150	150	150	150
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55	55	50	50

REMARKS:

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 15

Manuf. G. R. S. Co. Style/Model 2 Class/Form A
Dwg. No. 36103 Group/List 1 Spec'n. 13G-101R Cycles 60
Service Track Element 2 Position 3
CONTACTS Normal (d) 6 (i) ___ Reverse (d) 6 (i) ___
Front (d) ___ (i) ___ Back (d) ___ (i) ___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	1.0
Amperes	.25	1.56
Volt-Amperes	27.5	1.56
Watts	18.6	.93
Power Factor	.677	.60
Impedance (Ohms)	440.	.64
Phase Angle of Element	47° 23'	53° 7'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.160	.160	.176	.176
	Amps.	.250	.250	.275	.275
PICK-UP (Min.)	Volts	.128	.128	.115	.115
	Amps.	.200	.200	.180	.180
WORKING (Max.)	Volts	.264	.264	.291	.291
	Amps.	.413	.413	.455	.455
WORKING (Min.)	Volts	.192	.192	.173	.173
	Amps.	.300	.300	.270	.270
DROP-AWAY (Min.)	Volts	.083	.083	.075	.075
	Amps.	.130	.130	.117	.117
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		165	165	165	165
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		60	60	55	55

REMARKS:

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 16

Manuf. ______ Style/Model ______ Class/Form ______
Dwg. No. ______ Group/List ______ Spec'n. ______ Cycles ______
Service ______ Element ______ Position ______
CONTACTS Normal (d) ___ (i) ___ Reverse (d) ___ (i) ___
Front (d) ___ (i) ___ Back (d) ___ (i) ___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS:

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S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 17

Manuf. ____________ Style / Model } ____________ Class / Form } ______

Dwg. No. ______ Group / List } ____ Spec'n. __________ Cycles ______

Service ______________ Element ________ Position ______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)______

CONTACTS { Front (d)___(i)___ ‖ Back (d)___(i)______

CONTACTS { De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM } $\frac{W}{PU}$ × 100					
% DROP-AWAY / MINIMUM } $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 18

Manuf. ____________ Style / Model } ____________ Class / Form } ______

Dwg. No. ______ Group / List } ____ Spec'n. __________ Cycles ______

Service ______________ Element ________ Position ______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)______

CONTACTS { Front (d)___(i)___ ‖ Back (d)___(i)______

CONTACTS { De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM } $\frac{W}{PU}$ × 100					
% DROP-AWAY / MINIMUM } $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 19

Manuf. ____________ Style / Model } ____________ Class / Form } ______

Dwg. No. ______ Group / List } ____ Spec'n. __________ Cycles ______

Service ______________ Element ________ Position ______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)______

CONTACTS { Front (d)___(i)___ ‖ Back (d)___(i)______

CONTACTS { De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM } $\frac{W}{PU}$ × 100					
% DROP-AWAY / MINIMUM } $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 20

Manuf. ____________ Style / Model } ____________ Class / Form } ______

Dwg. No. ______ Group / List } ____ Spec'n. __________ Cycles ______

Service ______________ Element ________ Position ______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)______

CONTACTS { Front (d)___(i)___ ‖ Back (d)___(i)______

CONTACTS { De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM } $\frac{W}{PU}$ × 100					
% DROP-AWAY / MINIMUM } $\frac{DA}{PU}$ × 100					

REMARKS: ______________________________

(CONT'D ON PAGE 10)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 21

Manuf. G.R.S.Co. Style/Model 2 Class/Form A

Dwg. No. 36103 Group/List 1 Spec'n. 13G-113R Cycles 60

Service Line Element 2 Position 3

CONTACTS: Normal (d)___(i) 6 ‖ Reverse (d)___(i) 6

Front (d)___(i)___ ‖ Back (d)___(i)_____

De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.183	.055
Volt-Amperes	20.1	6.05
Watts	12.2	5.9
Power Factor	.605	.975
Impedance (Ohms)	600.	2000.
Phase Angle of Element	52° 46'	12° 50'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	32.0	32.0	35.0	35.0
	Amps.	.016	.016	.017	.017
PICK-UP (Min.)	Volts	25.	25.	22.5	22.5
	Amps.	.012	.012	.011	.011
WORKING (Max.)	Volts	48.	48.	49.5	49.5
	Amps.	.024	.024	.025	.025
WORKING (Min.)	Volts	32.	32.	29.	29.
	Amps.	.016	.016	.015	.015
DROP-AWAY (Min.)	Volts	16.	16.	14.5	14.5
	Amps.	.008	.008	.007	.007
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150	150	150	150
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55	55	50	50

REMARKS:

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 22

Manuf. G. R. S. Co. Style/Model 2 Class/Form A

Dwg. No. 36103 Group/List 1 Spec'n. 13G-87R Cycles 60

Service Line Element 2 Position 3

CONTACTS: Normal (d) 6 (i)___ ‖ Reverse (d) 6 (i)_____

Front (d)___(i)___ ‖ Back (d)___(i)_____

De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.183	.055
Volt-Amperes	20.1	6.05
Watts	12.2	5.9
Power Factor	.605	.975
Impedance (Ohms)	600.	2000.
Phase Angle of Element	52° 46'	12° 50'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	32.0	32.0	35.0	35.0
	Amps.	.016	.016	.017	.017
PICK-UP (Min.)	Volts	25.	25.	22.5	22.5
	Amps.	.012	.012	.011	.011
WORKING (Max.)	Volts	48.	48.	49.5	49.5
	Amps.	.024	.024	.025	.025
WORKING (Min.)	Volts	32.	32.	29.	29.
	Amps.	.016	.016	.015	.015
DROP-AWAY (Min.)	Volts	16.	16.	14.5	14.5
	Amps.	.008	.008	.007	.007
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150	150	150	150
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55	55	50	50

REMARKS:

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 23

Manuf.__________ Style/Model__________ Class/Form_____

Dwg. No.______ Group/List___ Spec'n.________ Cycles_____

Service____________ Element_______ Position____

CONTACTS: Normal (d)___(i)___ ‖ Reverse (d)___(i)_____

Front (d)___(i)___ ‖ Back (d)___(i)_____

De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS:

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 24

Manuf.__________ Style/Model__________ Class/Form_____

Dwg. No.______ Group/List___ Spec'n.________ Cycles_____

Service____________ Element_______ Position____

CONTACTS: Normal (d)___(i)___ ‖ Reverse (d)___(i)_____

Front (d)___(i)___ ‖ Back (d)___(i)_____

De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS:

(CONT'D ON PAGE 11)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 25

Manuf. ______ Style / Model ______ Class / Form ______

Dwg. No. ______ Group / List ______ Spec'n. ______ Cycles ______

Service ______ Element ______ Position ______

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___

CONTACTS Front (d)___(i)___ Back (d)___(i)___

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 26

Manuf. ______ Style / Model ______ Class / Form ______

Dwg. No. ______ Group / List ______ Spec'n. ______ Cycles ______

Service ______ Element ______ Position ______

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___

CONTACTS Front (d)___(i)___ Back (d)___(i)___

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 27

Manuf. ______ Style / Model ______ Class / Form ______

Dwg. No. ______ Group / List ______ Spec'n. ______ Cycles ______

Service ______ Element ______ Position ______

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___

CONTACTS Front (d)___(i)___ Back (d)___(i)___

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 28

Manuf. ______ Style / Model ______ Class / Form ______

Dwg. No. ______ Group / List ______ Spec'n. ______ Cycles ______

Service ______ Element ______ Position ______

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___

CONTACTS Front (d)___(i)___ Back (d)___(i)___

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

(CONT'D ON PAGE 12)

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 29

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 53A/109 Spec'n. ______ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.110
Volt-Amperes		12.1
Watts		8.5
Power Factor		.70
Impedance (Ohms)		1000.
Phase Angle of Element		45° 34'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	69.		69.	
	Amps.	.075		.075	
PICK-UP (Min.)	Volts	55.		55.	
	Amps.	.060		.060	
WORKING (Max.)	Volts	88.		88.	
	Amps.	.096		.096	
WORKING (Min.)	Volts	64.		64.	
	Amps.	.070		.070	
DROP-AWAY (Min.)	Volts	42.		36.	
	Amps.	.045		.039	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		140		140	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 30

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 70 Spec'n. ______ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i)___ Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.11
Volt-Amperes		12.1
Watts		8.5
Power Factor		.70
Impedance (Ohms)		1000.
Phase Angle of Element		45° 34'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	65.		71.5	
	Amps.	.065		.072	
PICK-UP (Min.)	Volts	60.		54.	
	Amps.	.060		.054	
WORKING (Max.)	Volts	81.5		90.	
	Amps.	.082		.090	
WORKING (Min.)	Volts	68.		61.	
	Amps.	.068		.061	
DROP-AWAY (Min.)	Volts	45.		40.5	
	Amps.	.045		.041	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		125		125	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 31

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 59-1 Spec'n. ______ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.12
Volt-Amperes		13.2
Watts		8.58
Power Factor		.65
Impedance (Ohms)		920.
Phase Angle of Element		48°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	69.		69.	
	Amps.	.075		.075	
PICK-UP (Min.)	Volts	55.		55.	
	Amps.	.060		.060	
WORKING (Max.)	Volts	88.		88.	
	Amps.	.096		.096	
WORKING (Min.)	Volts	64.		64.	
	Amps.	.070		.070	
DROP-AWAY (Min.)	Volts	42.		36.	
	Amps.	.045		.039	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		140		140	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 32

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 6 Spec'n. ______ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		130.
Amperes		.087
Volt-Amperes		11.3
Watts		8.1
Power Factor		.719
Impedance (Ohms)		1493.
Phase Angle of Element		44°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	85.		90.	
	Amps.	.057		.060	
PICK-UP (Min.)	Volts	65.		60.	
	Amps.	.044		.040	
WORKING (Max.)	Volts	105.		110.	
	Amps.	.070		.074	
WORKING (Min.)	Volts	80.		75.	
	Amps.	.054		.050	
DROP-AWAY (Min.)	Volts	50.		45.	
	Amps.	.034		.030	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		60		55	

REMARKS: ______

(CONT'D ON PAGE 13)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 33

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 92 Spec'n. Cycles 60
Service Line Element 2 Position 2
CONTACTS Normal (d) (i) Reverse (d) (i)
Front (d) 2 (i) 1 Back (d) 2 (i) 1
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.235	.04
Volt-Amperes	25.8	4.4
Watts	11.8	4.2
Power Factor	.455	.955
Impedance (Ohms)	468.	2750.
Phase Angle of Element	62° 56'	17° 15'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	25.		27.5	
	Amps.	.009		.010	
PICK-UP (Min.)	Volts	18.		16.	
	Amps.	.007		.006	
WORKING (Max.)	Volts	37.5		41.	
	Amps.	.014		.015	
WORKING (Min.)	Volts	22.		20.	
	Amps.	.008		.007	
DROP-AWAY (Min.)	Volts	11.		9.5	
	Amps.	.004		.003	
% WORKING MAXIMUM	$\frac{W}{PU} \times 100$	150		150	
% DROP-AWAY MINIMUM	$\frac{DA}{PU} \times 100$	55		50	

REMARKS: Slow Release Relay.

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 34

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group/List 1 Spec'n. 13H-7R Cycles 25
Service Line Element 2 Position 2
CONTACTS Normal (d) (i) Reverse (d) (i)
Front (d) 2 (i) 2 Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	55.	55.
Amperes	.33	.069
Volt-Amperes	18.2	3.8
Watts	9.	3.5
Power Factor	.5	.91
Impedance (Ohms)	167.	797.
Phase Angle of Element	60°	24°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	15.		16.	
	Amps.				
PICK-UP (Min.)	Volts	12.		11.5	
	Amps.				
WORKING (Max.)	Volts	26.		28.	
	Amps.				
WORKING (Min.)	Volts	21.		20.	
	Amps.				
DROP-AWAY (Min.)	Volts	8.		7.6	
	Amps.				
% WORKING MAXIMUM	$\frac{W}{PU} \times 100$	136		136	
% DROP-AWAY MINIMUM	$\frac{DA}{PU} \times 100$	55		50	

REMARKS: Slow Release Relay.

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 35

Manuf. Style/Model Class/Form
Dwg. No. Group/List Spec'n. Cycles
Service Element Position
CONTACTS Normal (d) (i) Reverse (d) (i)
Front (d) (i) Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM	$\frac{W}{PU} \times 100$				
% DROP-AWAY MINIMUM	$\frac{DA}{PU} \times 100$				

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 36

Manuf. Style/Model Class/Form
Dwg. No. Group/List Spec'n. Cycles
Service Element Position
CONTACTS Normal (d) (i) Reverse (d) (i)
Front (d) (i) Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM	$\frac{W}{PU} \times 100$				
% DROP-AWAY MINIMUM	$\frac{DA}{PU} \times 100$				

REMARKS:

(CONT'D ON PAGE 14)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 37

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37310 Group/List 96 Spec'n. Cycles 60

Service Track Element 2 Position 2

CONTACTS
- Normal (d) (i) | Reverse (d) (i)
- Front (d) 2 (i) 2 | Back (d) 2 (i)
- De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	8.	6.
Amperes	4.	.371
Volt-Amperes	32.	2.23
Watts	12.8	1.96
Power Factor	.40	.88
Impedance (Ohms)	2.	16.1
Phase Angle of Element	66° 34'	28° 21'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	1.288		1.417	
	Amps.	.080		.088	
PICK-UP (Min.)	Volts	.902		.805	
	Amps.	.056		.050	
WORKING (Max.)	Volts	1.932		2.125	
	Amps.	.120		.132	
WORKING (Min.)	Volts	1.352		1.224	
	Amps.	.084		.076	
DROP-AWAY (Min.)	Volts	.724		.644	
	Amps.	.045		.040	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		55		50	

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 38

Manuf. Style/Model Class/Form

Dwg. No. Group/List Spec'n. Cycles

Service Element Position

CONTACTS
- Normal (d) (i) | Reverse (d) (i)
- Front (d) (i) | Back (d) (i)
- De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 39

Manuf. Style/Model Class/Form

Dwg. No. Group/List Spec'n. Cycles

Service Element Position

CONTACTS
- Normal (d) (i) | Reverse (d) (i)
- Front (d) (i) | Back (d) (i)
- De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 40

Manuf. Style/Model Class/Form

Dwg. No. Group/List Spec'n. Cycles

Service Element Position

CONTACTS
- Normal (d) (i) | Reverse (d) (i)
- Front (d) (i) | Back (d) (i)
- De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS:

NEW YORK CENTRAL LINES
SIGNAL COMMITTEE
INSTRUCTIONS
A.C. RELAYS AND INDICATORS
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S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 41

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25
Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	21.5		22.5	
	Amps.	.16		.168	
PICK-UP (Min.)	Volts	17.2		16.5	
	Amps.	.129		.123	
WORKING (Max.)	Volts	30.		32.	
	Amps.	.22		.23	
WORKING (Min.)	Volts	21.		20.	
	Amps.	.16		.157	
DROP-AWAY (Min.)	Volts	12.		11.5	
	Amps.	.09		.089	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 01 to 0102 used on N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 42

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25
Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.20
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	26.		28.	
	Amps.	.19		.2	
PICK-UP (Min.)	Volts	18.5		17.6	
	Amps.	.138		.131	
WORKING (Max.)	Volts	36.		38.	
	Amps.	.26		.28	
WORKING (Min.)	Volts	26.		25.	
	Amps.	.192		.19	
DROP-AWAY (Min.)	Volts	12.		11.5	
	Amps.	.09		.087	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 366 to 3000 — N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 43

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25
Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	23.		24.	
	Amps.	.169		.18	
PICK-UP (Min.)	Volts	20.		19.	
	Amps.	.146		.14	
WORKING (Max.)	Volts	32.		34.	
	Amps.	.23		.245	
WORKING (Min.)	Volts	26.		25.	
	Amps.	.195		.185	
DROP-AWAY (Min.)	Volts	13.		12.5	
	Amps.	.098		.094	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 3001 to 4000 — N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 44

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25
Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	24.		25.	
	Amps.	.17		.18	
PICK-UP (Min.)	Volts	22.		21.	
	Amps.	.153		.145	
WORKING (Max.)	Volts	34.		36.	
	Amps.	.24		.25	
WORKING (Min.)	Volts	29.		28.	
	Amps.	.21		.2	
DROP-AWAY (Min.)	Volts	14.		13.	
	Amps.	.105		.1	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 4029 to 4522 — N.Y.C.R.R. (Electric Zone)

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S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No 45

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25

Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	28.		30.	
	Amps.	.205		.22	
PICK-UP (Min.)	Volts	21.		20.	
	Amps.	.159		.15	
WORKING (Max.)	Volts	38.		40.	
	Amps.	.28		.3	
WORKING (Min.)	Volts	29.		28.	
	Amps.	.205		.2	
DROP-AWAY (Min.)	Volts	15.		14.5	
	Amps.	.112		.105	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 6451 to 7236– N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No 46

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25

Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.372
Volt-Amperes		11.43
Watts		10.5
Power Factor		.2
Impedance (Ohms)		133.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	29.		31.	
	Amps.	.215		.22	
PICK-UP (Min.)	Volts	22.		21.	
	Amps.	.162		.155	
WORKING (Max.)	Volts	40.		42.	
	Amps.	.3		.32	
WORKING (Min.)	Volts	30.		29.	
	Amps.	.22		.215	
DROP-AWAY (Min.)	Volts	20.		19.	
	Amps.	.15		.142	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		130		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 8102 to 8283– N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No 47

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25

Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	30.		32.	
	Amps.	.218		.23	
PICK-UP (Min.)	Volts	26.		25.	
	Amps.	.194		.185	
WORKING (Max.)	Volts	40.		42.	
	Amps.	.3		.32	
WORKING (Min.)	Volts	28.		26.	
	Amps.	.196		.194	
DROP-AWAY (Min.)	Volts	18.		17.	
	Amps.	.135		.128	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: To be used for Serial Nos. 9055 to 9728– N.Y.C.R.R. (Electric Zone)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No 48

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37310 Group List ___ Spec'n. 48 Cycles 25

Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 2 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.375
Volt-Amperes		11.45
Watts		10.5
Power Factor		.2
Impedance (Ohms)		134.
Phase Angle of Element		53°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	30.		32.	
	Amps.	.225		.234	
PICK-UP (Min.)	Volts	25.		24.	
	Amps.	.152		.144	
WORKING (Max.)	Volts	42.		44.	
	Amps.	.31		.326	
WORKING (Min.)	Volts	29.		27.	
	Amps.	.21		.2	
DROP-AWAY (Min.)	Volts	15.		14.	
	Amps.	.11		.105	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		70	

REMARKS: To be used for Serial Nos. 11154 to 22166– N.Y.C.R.R. (Electric Zone)

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S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 49

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 43300-1 Group List ____ Spec'n. ________ Cycles 25
Service Line Element 1 Position 2
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d) 2 (i)___ Back (d) 2 (i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.69
Volt-Amperes		37.95
Watts		29.25
Power Factor		.77
Impedance (Ohms)		79.7
Phase Angle of Element		40°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 3		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts			42.	
	Amps.	.535			
PICK-UP (Min.)	Volts			32.	
	Amps.	.40			
WORKING (Max.)	Volts			54.	
	Amps.	.69			
WORKING (Min.)	Volts			43.	
	Amps.	.535			
DROP-AWAY (Min.)	Volts			20.	
	Amps.	.22			
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		*55		*50	

REMARKS: Slow Pick-up Relay, *55% Contacts just open, 25% Contacts full open 90 Sec.- N.Y.C. (Elec. Zone)

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 50

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 34780 Group List ___ Spec'n. ________ Cycles 25
Service Line Indicator Element 1 Position 2
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		55.0
Amperes		.26
Volt-Amperes		13.52
Watts		8.7
Power Factor		.64
Impedance (Ohms)		134.
Phase Angle of Element		52°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 3		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.182		.192	
PICK-UP (Min.)	Volts				
	Amps.	.145		.138	
WORKING (Max.)	Volts				
	Amps.	.182		.192	
WORKING (Min.)	Volts				
	Amps.	.145		.138	
DROP-AWAY (Min.)	Volts				
	Amps.	.120		.115	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		70		65	

REMARKS: N.Y.C.R.R. (Electric Zone)

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 51

Manuf. ________ Style/Model ________ Class/Form ____
Dwg. No. ______ Group List ___ Spec'n. ________ Cycles ____
Service ____________ Element _______ Position ____
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ______________________

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 52

Manuf. ________ Style/Model ________ Class/Form ____
Dwg. No. ______ Group List ___ Spec'n. ________ Cycles ____
Service ____________ Element _______ Position ____
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____
Front (d)___(i)___ Back (d)___(i)_____
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ______________________

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S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 53

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37312 Group List 28 Spec'n. ____ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 4 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.11
Volt-Amperes		12.1
Watts		8.5
Power Factor		.70
Impedance (Ohms)		1000.
Phase Angle of Element		45°34'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	68.		73.	
	Amps.	.068		.073	
PICK-UP (Min.)	Volts	63.		57.	
	Amps.	.063		.057	
WORKING (Max.)	Volts	85.		93.5	
	Amps.	.085		.093	
WORKING (Min.)	Volts	71.		64.	
	Amps.	.071		.064	
DROP-AWAY (Min.)	Volts	48.		43.	
	Amps.	.048		.043	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		125		125	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 54

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37312 Group List 13-1 Spec'n. ____ Cycles 60
Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 4 (i)___ Back (d) 4 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.135
Volt-Amperes		14.9
Watts		9.7
Power Factor		.65
Impedance (Ohms)		815.
Phase Angle of Element		49°27'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	65.		71.5	
	Amps.	.080		.088	
PICK-UP (Min.)	Volts	60.		54.	
	Amps.	.073		.066	
WORKING (Max.)	Volts	81.5		90.	
	Amps.	.1		.11	
WORKING (Min.)	Volts	68.		61.	
	Amps.	.083		.075	
DROP-AWAY (Min.)	Volts	45.		40.5	
	Amps.	.055		.050	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		125		125	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 55

Manuf. G.R.S.Co. Style/Model 2 Class/Form B
Dwg. No. 37312 Group List 60 Spec'n. ____ Cycles 60
Service Line Element 2 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d) 2 (i) 4 Back (d) 2 (i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.17	.04
Volt-Amperes	18.7	4.4
Watts	8.8	4.2
Power Factor	.47	.955
Impedance (Ohms)	650.	2750.
Phase Angle of Element	61°57'	17°15'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	30.		33.	
	Amps.	.011		.012	
PICK-UP (Min.)	Volts	23.		20.5	
	Amps.	.008		.007	
WORKING (Max.)	Volts	45.		49.5	
	Amps.	.016		.018	
WORKING (Min.)	Volts	27.		24.	
	Amps.	.01		.009	
DROP-AWAY (Min.)	Volts	14.		12.5	
	Amps.	.005		.004	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		150		150	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55		50	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 56

Manuf. ______ Style/Model ______ Class/Form ____
Dwg. No. ______ Group List ___ Spec'n. ______ Cycles ____
Service ______ Element ______ Position ____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)___
Front (d)___(i)___ Back (d)___(i)___
De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

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S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 57

Manuf. G.R.S.Co. Style/Model 2 Class/Form B

Dwg. No. 37314 Group/List 12 Spec'n. ________ Cycles 60

Service Line Element 1 Position 2

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

CONTACTS Front (d) 2 (i) 1 Back (d) 2 (i) 1

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.135
Volt-Amperes		14.9
Watts		9.7
Power Factor		.65
Impedance (Ohms)		815.
Phase Angle of Element		49°27'

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	60.		66.	
	Amps.	.073		.081	
PICK-UP (Min.)	Volts	50.		45.	
	Amps.	.061		.055	
WORKING (Max.)	Volts	66.		72.	
	Amps.	.081		.088	
WORKING (Min.)	Volts	55.		50.	
	Amps.	.067		.061	
DROP-AWAY (Min.)	Volts	38.		34.	
	Amps.	.047		.042	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		110		110	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		65	

REMARKS: ______________________

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 58

Manuf. __________ Style/Model __________ Class/Form ____

Dwg. No. ______ Group/List ___ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position ____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

CONTACTS Front (d)___(i)___ Back (d)___(i)_____

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______________________

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 59

Manuf. __________ Style/Model __________ Class/Form ____

Dwg. No. ______ Group/List ___ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position ____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

CONTACTS Front (d)___(i)___ Back (d)___(i)_____

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______________________

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No. 60

Manuf. __________ Style/Model __________ Class/Form ____

Dwg. No. ______ Group/List ___ Spec'n. ________ Cycles _____

Service ______________ Element _______ Position ____

CONTACTS Normal (d)___(i)___ Reverse (d)___(i)_____

CONTACTS Front (d)___(i)___ Back (d)___(i)_____

CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______________________

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S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 61

Manuf. G.R.S.Co. Style/Model P10 Class/Form L

Dwg. No. 51500-2 Group/List 1 Spec'n. 13K-28R Cycles 25

Service Line Element 2 Position 3

CONTACTS: Normal (d) 6 (i) ___ Reverse (d) 6 (i) ___

Front (d) ___ (i) ___ Back (d) ___ (i) ___

De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	55.	55.
Amperes	.458	.115
Volt-Amperes	25.	6.32
Watts	6.25	5.84
Power Factor	.25	.925
Impedance (Ohms)	120.	480.
Phase Angle of Element	75°	22°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	20.	20.	21.	21.
	Amps.				
PICK-UP (Min.)	Volts	16.	16.	14.	14.
	Amps.				
WORKING (Max.)	Volts	40.	40.	42.	42.
	Amps.				
WORKING (Min.)	Volts	30.	30.	28.	28.
	Amps.				
DROP-AWAY (Min.)	Volts	8.5	8.5	8.	8.
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136	136	136	136
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70	70	65	65

REMARKS: Vane Type Relay.

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 62

Manuf. G.R.S.Co. Style/Model D-10 Class/Form T-2-R

Dwg. No. 51500-2 Group/List 3 Spec'n. 13K-22R Cycles 25

Service Track Element 2 Position 2

CONTACTS: Normal (d) ___ (i) ___ Reverse (d) ___ (i) ___

Front (d) 2 (i) 2 Back (d) 2 (i) ___

De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	50.	1.
Amperes	.70	5.32
Volt-Amperes	35.	5.32
Watts	7.7	2.39
Power Factor	.22	.45
Impedance (Ohms)	75.	.188
Phase Angle of Element	77°	63°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts				
	Amps.	1.02		1.07	
PICK-UP (Min.)	Volts				
	Amps.	.78		.74	
WORKING (Max.)	Volts				
	Amps.	2.		2.1	
WORKING (Min.)	Volts				
	Amps.	1.2		1.14	
DROP-AWAY (Min.)	Volts				
	Amps.	.66		.62	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		136		136	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		55		50	

REMARKS: Vane Type Relay.

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 63

Manuf. ___ Style/Model ___ Class/Form ___

Dwg. No. ___ Group/List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS: Normal (d) ___ (i) ___ Reverse (d) ___ (i) ___

Front (d) ___ (i) ___ Back (d) ___ (i) ___

De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ___

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 64

Manuf. ___ Style/Model ___ Class/Form ___

Dwg. No. ___ Group/List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS: Normal (d) ___ (i) ___ Reverse (d) ___ (i) ___

Front (d) ___ (i) ___ Back (d) ___ (i) ___

De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ___		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 65

Manuf. G.R.S.Co. Style/Model 1 Class/Form
Dwg. No. 15140 Group List Spec'n. Cycles 25
Service Track Element 2 Position 2
CONTACTS Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) 2 ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	1.72	1.02
Amperes	5.75	2.
Volt-Amperes	9.9	2.04
Watts	9.06	1.96
Power Factor	.95	.96
Impedance (Ohms)	.30	.50
Phase Angle of Element	18°	16°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 4		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.83		.87	
PICK-UP (Min.)	Volts				
	Amps.	.50		.475	
WORKING (Max.)	Volts				
	Amps.	1.13		1.17	
WORKING (Min.)	Volts				
	Amps.	.60		.57	
DROP-AWAY (Min.)	Volts				
	Amps.	.275		.26	
% WORKING MAXIMUM } $\frac{W}{PU}$ x 100		136		136	
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ x 100		55		50	

REMARKS: Iron Rotor Relay.

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 66

Manuf. G.R.S.Co. Style/Model 1 Class/Form
Dwg. No. 17000 Group List Spec'n. Cycles 25
Service Track Element 2 Position 2
CONTACTS Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) 4 ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	1.6	.70
Amperes	5.5	2.1
Volt-Amperes	8.7	1.47
Watts	8.2	1.325
Power Factor	.94	.9025
Impedance (Ohms)	.291	.33
Phase Angle of Element	20°	25°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 4		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.90		.95	
PICK-UP (Min.)	Volts				
	Amps.	.56		.53	
WORKING (Max.)	Volts				
	Amps.	1.24		1.30	
WORKING (Min.)	Volts				
	Amps.	.76		.72	
DROP-AWAY (Min.)	Volts				
	Amps.	.31		.30	
% WORKING MAXIMUM } $\frac{W}{PU}$ x 100		136		136	
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ x 100		55		50	

REMARKS: Iron Rotor Relay.

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 67

Manuf. G.R.S.Co. Style/Model 1 Class/Form
Dwg. No. 17008 Group List Spec'n. Cycles 25
Service Track Element 2 Position 2
CONTACTS Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) 4 ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	14.6	.68
Amperes	1.75	2.
Volt-Amperes	25.5	1.36
Watts	24.7	1.27
Power Factor	.97	.94
Impedance (Ohms)	8.35	.34
Phase Angle of Element	15°	21°

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 4		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.	.87		.915	
PICK-UP (Min.)	Volts				
	Amps.	.38		.36	
WORKING (Max.)	Volts				
	Amps.	1.18		1.24	
WORKING (Min.)	Volts				
	Amps.	.50		.47	
DROP-AWAY (Min.)	Volts				
	Amps.	.21		.20	
% WORKING MAXIMUM } $\frac{W}{PU}$ x 100		136		136	
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ x 100		55		50	

REMARKS: Iron Rotor Relay.

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 68

Manuf. Style/Model Class/Form
Dwg. No. Group List Spec'n. Cycles
Service Element Position
CONTACTS Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ x 100					

REMARKS:

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A. C. RELAY REQUIREMENTS—TABLE No. 69

Manuf. ___ Style / Model ___ Class / Form ___

Dwg. No. ___ Group / List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS
Normal (d)___(i)___ Reverse (d)___(i)___
Front (d)___(i)___ Back (d)___(i)___
De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY / MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ___

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 70

Manuf. ___ Style / Model ___ Class / Form ___

Dwg. No. ___ Group / List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS
Normal (d)___(i)___ Reverse (d)___(i)___
Front (d)___(i)___ Back (d)___(i)___
De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY / MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ___

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 71

Manuf. ___ Style / Model ___ Class / Form ___

Dwg. No. ___ Group / List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS
Normal (d)___(i)___ Reverse (d)___(i)___
Front (d)___(i)___ Back (d)___(i)___
De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY / MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ___

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE No. 72

Manuf. ___ Style / Model ___ Class / Form ___

Dwg. No. ___ Group / List ___ Spec'n. ___ Cycles ___

Service ___ Element ___ Position ___

CONTACTS
Normal (d)___(i)___ Reverse (d)___(i)___
Front (d)___(i)___ Back (d)___(i)___
De-energized ___

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING / MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY / MINIMUM $\frac{DA}{PU}$ x 100					

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 73

Manuf. U.S. & S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 9 Cycles 60
Service Track Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) 2 ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		7.4
Amperes		2.4
Volt-Amperes		17.7
Watts		8.9
Power Factor		.5
Impedance (Ohms)		3.08
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	3.15		3.3	
	Amps.	1.05		1.1	
PICK-UP (Min.)	Volts	2.85		2.7	
	Amps.	.95		.9	
WORKING (Max.)	Volts	7.76		8.15	
	Amps.	2.52		2.64	
WORKING (Min.)	Volts	7.02		6.65	
	Amps.	2.28		2.16	
DROP-AWAY (Min.)	Volts	2.56		2.16	
	Amps.	.85		.72	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		258		271	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS:

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 74

Manuf. U.S. & S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 101 Cycles 60
Service Track Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) 2 (i) ‖ Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		6.
Amperes		4.5
Volt-Amperes		27.
Watts		
Power Factor		
Impedance (Ohms)		1.33
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	2.73		2.86	
	Amps.	2.1		2.2	
PICK-UP (Min.)	Volts	2.47		2.34	
	Amps.	1.9		1.8	
WORKING (Max.)	Volts	6.3		6.6	
	Amps.	4.72		4.95	
WORKING (Min.)	Volts	5.7		5.4	
	Amps.	4.27		4.05	
DROP-AWAY (Min.)	Volts	2.22		1.87	
	Amps.	1.71		1.44	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		242		254	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS:

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 75

Manuf. U.S. & S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 1031 Cycles 25
Service Track Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) 2 (i) ‖ Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		2.7
Amperes		1.6
Volt-Amperes		4.31
Watts		2.4
Power Factor		.55
Impedance (Ohms)		1.69
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	2.2		2.31	
	Amps.	1.36		1.43	
PICK-UP (Min.)	Volts	1.99		1.89	
	Amps.	1.24		1.17	
WORKING (Max.)	Volts	2.84		2.97	
	Amps.	1.68		1.76	
WORKING (Min.)	Volts	2.56		2.43	
	Amps.	1.52		1.44	
DROP-AWAY (Min.)	Volts	1.89		1.60	
	Amps.	1.18		.99	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		135		141	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		95		85	

REMARKS:

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(See Instructions No. 40)

A.G. RELAY REQUIREMENTS—TABLE Nº 76

Manuf. U.S. & S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 1031 Cycles 60
Service Track Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) 4 (i) ‖ Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		4.9
Amperes		1.7
Volt-Amperes		8.34
Watts		5.2
Power Factor		.62
Impedance (Ohms)		2.88
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	3.67		3.85	
	Amps.	1.31		1.37	
PICK-UP (Min.)	Volts	3.32		3.14	
	Amps.	1.18		1.12	
WORKING (Max.)	Volts	5.14		5.39	
	Amps.	1.78		1.87	
WORKING (Min.)	Volts	4.65		4.4	
	Amps.	1.61		1.53	
DROP-AWAY (Min.)	Volts	3.15		2.67	
	Amps.	1.12		.95	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		147		154	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		95		85	

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A.C. RELAY REQUIREMENTS—TABLE Nº 77

Manuf. U.S.&S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 1031 Cycles 60
Service Track Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) 4 (i) ‖ Back (d) 4 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		5.02
Amperes		1.79
Volt-Amperes		9.
Watts		5.75
Power Factor		.64
Impedance (Ohms)		2.8
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	4.04		4.22	
	Amps.	1.42		1.48	
PICK-UP (Min.)	Volts	3.65		3.46	
	Amps.	1.28		1.21	
WORKING (Max.)	Volts	5.27		5.52	
	Amps.	1.88		1.97	
WORKING (Min.)	Volts	4.76		4.52	
	Amps.	1.7		1.61	
DROP-AWAY (Min.)	Volts	3.46		2.94	
	Amps.	1.21		1.03	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		137		143	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		95		85	

REMARKS:

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(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 78

Manuf. Style/Model Class/Form
Dwg. No. Group/List Spec'n. Cycles
Service Element Position

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS:

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(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 79

Manuf. Style/Model Class/Form
Dwg. No. Group/List Spec'n. Cycles
Service Element Position

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS:

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(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 80

Manuf. U.S.&S.Co. Style/Model SLV-13 Class/Form
Dwg. No. C4194 Group/List Spec'n. 1259 Cycles 60
Service Line Element 1 Position 2

CONTACTS
Normal (d) (i) ‖ Reverse (d) (i)
Front (d) (i) 8 ‖ Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		220.
Amperes		.095
Volt-Amperes		20.9.
Watts		13.
Power Factor		.62
Impedance (Ohms)		2320.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	173.		181.	
	Amps.	.073		.076	
PICK-UP (Min.)	Volts	156.		143.	
	Amps.	.066		.063	
WORKING (Max.)	Volts	231.		242.	
	Amps.	.100		.104	
WORKING (Min.)	Volts	208.		198.	
	Amps.	.090		.085	
DROP-AWAY (Min.)	Volts	140.		114.	
	Amps.	.059		.050	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		140		147	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

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A. C. RELAY REQUIREMENTS—TABLE Nº 81

Manuf. U.S.& S.Co. Style/Model SLV-13 Class/Form ____

Dwg. No. C4194 Group/List ____ Spec'n. 1008 Cycles 60

Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___; Front (d)___(i) 6 Back (d)___(i) 2; De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.18
Volt-Amperes		19.8
Watts		12.5
Power Factor		.63
Impedance (Ohms)		610.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	60.		62.5	
	Amps.	.105		.110	
PICK-UP (Min.)	Volts	54.		51.3	
	Amps.	.095		.090	
WORKING (Max.)	Volts	94.5		99.	
	Amps.	.157		.165	
WORKING (Min.)	Volts	85.5		81.	
	Amps.	.142		.135	
DROP-AWAY (Min.)	Volts	51.3		43.5	
	Amps.	.090		.076	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		166		173	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		95		85	

REMARKS: ____

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 82

Manuf. U.S.& S.Co. Style/Model SLV-13 Class/Form ____

Dwg. No. C4194 Group/List ____ Spec'n. 1008 Cycles 60

Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___; Front (d) 4 (i)___ Back (d) 2 (i)___; De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.125
Volt-Amperes		13.75
Watts		8.5
Power Factor		.62
Impedance (Ohms)		880.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	73.5		77.	
	Amps.	.084		.088	
PICK-UP (Min.)	Volts	66.5		62.9	
	Amps.	.076		.071	
WORKING (Max.)	Volts	99.8		104.5	
	Amps.	.110		.115	
WORKING (Min.)	Volts	90.3		85.5	
	Amps.	.1		.095	
DROP-AWAY (Min.)	Volts	63.1		53.4	
	Amps.	.072		.060	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		142		149	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		95		85	

REMARKS: ____

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 83

Manuf. U.S.& S.Co. Style/Model SLV-13 Class/Form ____

Dwg. No. C4194 Group/List ____ Spec'n. 1008 Cycles ____

Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___; Front (d) 4 (i)___ Back (d) 4 (i)___; De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.125
Volt-Amperes		13.75
Watts		8.5
Power Factor		.62
Impedance (Ohms)		880.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	73.5		77.	
	Amps.	.084		.088	
PICK-UP (Min.)	Volts	66.5		62.9	
	Amps.	.076		.071	
WORKING (Max.)	Volts	99.8		104.5	
	Amps.	.110		.115	
WORKING (Min.)	Volts	90.3		85.5	
	Amps.	.100		.095	
DROP-AWAY (Min.)	Volts	63.1		53.4	
	Amps.	.072		.060	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		142		149	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		95		85	

REMARKS: ____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 84

Manuf. U.S.& S.Co. Style/Model SLV-13 Class/Form ____

Dwg. No. C4194 Group/List ____ Spec'n. 1259 Cycles 25

Service Line Element 1 Position 2

CONTACTS: Normal (d)___(i)___ Reverse (d)___(i)___; Front (d)___(i) 8 Back (d)___(i)___; De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		220.
Amperes		.075
Volt-Amperes		16.5
Watts		7.
Power Factor		.42
Impedance (Ohms)		2930.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	173.		181.	
	Amps.	.057		.061	
PICK-UP (Mih.)	Volts	156.		143.	
	Amps.	.052		.050	
WORKING (Max.)	Volts	231.		242.	
	Amps.	.079		.082	
WORKING (Min.)	Volts	208.		198.	
	Amps.	.071		.067	
DROP-AWAY (Min.)	Volts	140.		114.	
	Amps.	.046		.039	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		140		147	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		90		80	

REMARKS: ____

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 85

Manuf. U.S. & S.Co. Style/Model 15 Class/Form
Dwg. No. C8813 Group List Spec'n. 725A Cycles 60
Service Track Element 2 Position 2

CONTACTS
Normal (d) (i) | Reverse (d) (i)
Front (d) 4 (i) | Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.45
Amperes	.40	.35
Volt-Amperes	44.	.157
Watts	11.	
Power Factor	.44	.40
Impedance (Ohms)	275.	1.28
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	.29		.31	
	Amps.	.21		.22	
PICK-UP (Min.)	Volts	.26		.25	
	Amps.	.19		.18	
WORKING (Max.)	Volts	.47		.495	
	Amps.	.37		.385	
WORKING (Min.)	Volts	.42		.405	
	Amps.	.33		.315	
DROP-AWAY (Min.)	Volts	.23		.20	
	Amps.	.17		.14	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		168		177	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS:

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 86

Manuf. U.S. & S.Co. Style/Model 15 Class/Form
Dwg.No. C8813 Group List Spec'n. 762 Cycles 60
Service Track Element 2 Position 3

CONTACTS
Normal (d) 4 (i) | Reverse (d) 4 (i)
Front (d) (i) | Back (d) (i)
De-energized 1

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.62
Amperes	.40	.62
Volt-Amperes	44.	.385
Watts	11.	
Power Factor	.25	1.
Impedance (Ohms)	275.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	.294	.294	.308	.308
	Amps.	.294	.294	.308	.308
PICK-UP (Min.)	Volts	.266	.266	.250	.250
	Amps.	.266	.266	.250	.250
WORKING (Max.)	Volts	.650	.650	.680	.680
	Amps.	.650	.650	.680	.680
WORKING (Min.)	Volts	.580	.580	.557	.557
	Amps.	.580	.580	.557	.557
DROP-AWAY (Min.)	Volts	.210	.210	.175	.175
	Amps.	.210	.210	.175	.175
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		232	232	243	243
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		80	80	70	70

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 87

Manuf. U.S.& S.Co. Style/Model 15 Class/Form
Dwg.No. C8813 Group List Spec'n. 762 Cycles 60
Service Track Element 2 Position 3

CONTACTS
Normal (d) 4 (i) | Reverse (d) 4 (i)
Front (d) (i) | Back (d) (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.54
Amperes	.40	.54
Volt-Amperes	44.	.29
Watts	11.	
Power Factor	.25	1.
Impedance (Ohms)	275.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	.262	.262	.275	.275
	Amps.	.262	.262	.275	.275
PICK-UP (Min.)	Volts	.238	.238	.225	.225
	Amps.	.238	.238	.225	.225
WORKING (Max.)	Volts	.566	.566	.595	.595
	Amps.	.566	.566	.595	.595
WORKING (Min.)	Volts	.510	.510	.485	.485
	Amps.	.510	.510	.485	.485
DROP-AWAY (Min.)	Volts	.190	.190	.150	.150
	Amps.	.190	.190	.150	.150
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		226	226	238	238
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		80	80	70	70

REMARKS:

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 88

Manuf. U.S.& S.Co. Style/Model 15 Class/Form
Dwg. No. C8813 Group List Spec'n. 1057 Cycles 60
Service Track Element 2 Position 2

CONTACTS
Normal (d) (i) | Reverse (d) (i)
Front (d) 4 (i) | Back (d) 2 (i)
De-energized

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	130.	.45
Amperes	.34	.35
Volt-Amperes	44.1	.157
Watts	11.	
Power Factor	.25	.40
Impedance (Ohms)	382.	1.28
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST Normal	SHOP TEST Reverse	FIELD TEST Normal	FIELD TEST Reverse
PICK-UP (Max.)	Volts	.294		.308	
	Amps.	.210		.220	
PICK-UP (Min.)	Volts	.266		.252	
	Amps.	.190		.180	
WORKING (Max.)	Volts	.472		.495	
	Amps.	.368		.385	
WORKING (Min.)	Volts	.426		.405	
	Amps.	.332		.315	
DROP-AWAY (Min.)	Volts	.239		.202	
	Amps.	.171		.144	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		168		177	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 89

Manuf. U.S.&S.Co. Style/Model 15 Class/Form

Dwg. No. C8813 Group List Spec'n. 1195 Cycles 60

Service Track Element 2 Position 3

CONTACTS: Normal (d) 4 (i) — Reverse (d) 4 (i) —; Front (d) — (i) — Back (d) — (i) —; De-energized —

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.50
Amperes	.44	.50
Volt-Amperes	48.4	.25
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.23	.23	.24	.24
	Amps.	.23	.23	.24	.24
PICK-UP (Min.)	Volts	.21	.21	.19	.19
	Amps.	.21	.21	.19	.19
WORKING (Max.)	Volts	.53	.53	.55	.55
	Amps.	.53	.53	.55	.55
WORKING (Min.)	Volts	.47	.47	.42	.42
	Amps.	.47	.47	.42	.42
DROP-AWAY (Min.)	Volts	.16	.16	.13	.13
	Amps.	.16	.16	.13	.13
% WORKING MAXIMUM $\frac{W}{PU}$ X 100		241	241	250	250
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ X 100		80	80	70	70

REMARKS:

S.G.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 90

Manuf. U.S.&S.Co. Style/Model 15 Class/Form

Dwg. No. C8813 Group List Spec'n. 1195 Cycles 60

Service Track Element 2 Position 3

CONTACTS: Normal (d) 6 (i) — Reverse (d) 6 (i) —; Front (d) — (i) — Back (d) — (i) —; De-energized —

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.65
Amperes	.44	.65
Volt-Amperes	48.4	.42
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.23	.23	.24	.24
	Amps.	.23	.23	.24	.24
PICK-UP (Min.)	Volts	.21	.21	.19	.19
	Amps.	.21	.21	.19	.19
WORKING (Max.)	Volts	.68	.68	.72	.72
	Amps.	.68	.68	.72	.72
WORKING (Min.)	Volts	.62	.62	.58	.58
	Amps.	.62	.62	.58	.58
DROP-AWAY (Min.)	Volts	.16	.16	.13	.13
	Amps.	.16	.16	.13	.13
% WORKING MAXIMUM $\frac{W}{PU}$ X 100		309	309	327	327
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ X 100		80	80	70	70

REMARKS:

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 91

Manuf. U.S.&S.Co. Style/Model 15 Class/Form

Dwg. No. C8813 Group List Spec'n. 1195A Cycles 60

Service Track Element 2 Position 2

CONTACTS: Normal (d) — (i) — Reverse (d) — (i) —; Front (d) 6 (i) — Back (d) 2 (i) —; De-energized —

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.5
Amperes	.44	.5
Volt-Amperes	48.4	.25
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.37		.385	
	Amps.	.37		.385	
PICK-UP (Min.)	Volts	.33		.31	
	Amps.	.33		.31	
WORKING (Max.)	Volts	.525		.55	
	Amps.	.525		.55	
WORKING (Min.)	Volts	.475		.45	
	Amps.	.475		.45	
DROP-AWAY (Min.)	Volts	.297		.248	
	Amps.	.297		.248	
% WORKING MAXIMUM $\frac{W}{PU}$ X 100		150		157	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ X 100		90		80	

REMARKS:

S.G.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 92

Manuf. U.S.&S.Co. Style/Model 15 Class/Form

Dwg. No. C8813 Group List Spec'n. 1195A Cycles 60

Service Track Element 2 Position 2

CONTACTS: Normal (d) — (i) — Reverse (d) — (i) —; Front (d) — (i) 8 Back (d) — (i) 4; De-energized —

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.55
Amperes	.44	.55
Volt-Amperes	48.4	.30
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.37		.385	
	Amps.	.37		.385	
PICK-UP (Min.)	Volts	.33		.31	
	Amps.	.33		.31	
WORKING (Max.)	Volts	.577		.605	
	Amps.	.577		.605	
WORKING (Min.)	Volts	.52		.495	
	Amps.	.52		.495	
DROP-AWAY (Min.)	Volts	.297		.248	
	Amps.	.297		.248	
% WORKING MAXIMUM $\frac{W}{PU}$ X 100		165		173	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ X 100		90		80	

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(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 93

Manuf. U.S.& S.Co. Style/Model 15 Class/Form ----
Dwg. No. C8813 Group/List ---- Spec'n. 1195A Cycles 60
Service Track Element 2 Position 2
CONTACTS Normal (d)---(i)--- Reverse (d)---(i)----
CONTACTS Front (d) 6 (i)--- Back (d) 4 (i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.5
Amperes	.44	.5
Volt-Amperes	48.4	.25
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	1.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.37		.385	
	Amps.	.37		.385	
PICK-UP (Min.)	Volts	.33		.31	
	Amps.	.33		.31	
WORKING (Max.)	Volts	.525		.55	
	Amps.	.525		.55	
WORKING (Min.)	Volts	.475		.45	
	Amps.	.475		.45	
DROP-AWAY (Min.)	Volts	.297		.248	
	Amps.	.297		.248	
% WORKING/MAXIMUM $\frac{W}{PU} \times 100$		150		157	
% DROP-AWAY/MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS: ----

S.C. 20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 94

Manuf. U. S. & S. Co. Style/Model 15 Class/Form ----
Dwg. No. C8813 Group/List ---- Spec'n. 1263 Cycles 60
Service Track Element 2 Position 3
CONTACTS Normal (d) 5 (i)--- Reverse (d) 5 (i)----
CONTACTS Front (d)---(i)--- Back (d)---(i)----
De-energized 1

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.73
Amperes	.44	1.04
Volt-Amperes	48.4	.76
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	.70
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.38	.38	.39	.39
	Amps.	.53	.53	.56	.56
PICK-UP (Min.)	Volts	.34	.34	.32	.32
	Amps.	.48	.48	.46	.46
WORKING (Max.)	Volts	.76	.76	.80	.80
	Amps.	1.09	1.09	1.14	1.14
WORKING (Min.)	Volts	.69	.69	.65	.65
	Amps.	.99	.99	.94	.94
DROP-AWAY (Min.)	Volts	.27	.27	.22	.22
	Amps.	.39	.39	.32	.32
% WORKING/MAXIMUM $\frac{W}{PU} \times 100$		212	212	222	222
% DROP-AWAY/MINIMUM $\frac{DA}{PU} \times 100$		80	80	70	70

REMARKS: ----

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 95

Manuf. U. S. & S. Co. Style/Model 15 Class/Form ----
Dwg. No. C8813 Group/List ---- Spec'n. 1263 Cycles 60
Service Track Element 2 Position 3
CONTACTS Normal (d) 4 (i)--- Reverse (d) 4 (i)----
CONTACTS Front (d)---(i)--- Back (d)---(i)----
De-energized 2

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.83
Amperes	.44	1.18
Volt-Amperes	48.4	.98
Watts	23.	
Power Factor	.47	.91
Impedance (Ohms)	250.	.70
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.44	.44	.46	.46
	Amps.	.63	.63	.66	.66
PICK-UP (Min.)	Volts	.39	.39	.37	.37
	Amps.	.57	.57	.54	.54
WORKING (Max.)	Volts	.87	.87	.92	.92
	Amps.	1.24	1.24	1.30	1.30
WORKING (Min.)	Volts	.78	.78	.74	.74
	Amps.	1.12	1.12	1.06	1.06
DROP-AWAY (Min.)	Volts	.32	.32	.25	.25
	Amps.	.45	.45	.37	.37
% WORKING/MAXIMUM $\frac{W}{PU} \times 100$		206	206	218	218
% DROP-AWAY/MINIMUM $\frac{DA}{PU} \times 100$		80	80	70	70

REMARKS: ----

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE Nº 96

Manuf. U.S. & S.Co. Style/Model 15 Class/Form ----
Dwg. No. C8813 Group/List ---- Spec'n. 1408 Cycles 60
Service Track Element 2 Position 2
CONTACTS Normal (d)---(i)--- Reverse (d)---(i)----
CONTACTS Front (d) 4 (i)--- Back (d) 2 (i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.58
Amperes	.44	1.55
Volt-Amperes	48.5	.90
Watts	23.	
Power Factor	.47	.70 Lead
Impedance (Ohms)	250.	.37
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.26		.28	
	Amps.	.71		.74	
PICK-UP (Min.)	Volts	.23		.22	
	Amps.	.63		.60	
WORKING (Max.)	Volts	.61		.64	
	Amps.	1.63		1.71	
WORKING (Min.)	Volts	.55		.52	
	Amps.	1.47		1.39	
DROP-AWAY (Min.)	Volts	.21		.18	
	Amps.	.57		.48	
% WORKING/MAXIMUM $\frac{W}{PU} \times 100$		244		256	
% DROP-AWAY/MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS: ----

(CONT'D ON PAGE 29)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 97

Manuf.___________ Style Model }___________ Class Form }_____

Dwg. No. ______ Group List }____ Spec'n.__________ Cycles______

Service______________ Element_______ Position______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:____________________________

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 98

Manuf.___________ Style Model }___________ Class Form }_____

Dwg. No.______ Group List }____ Spec'n.__________ Cycles______

Service______________ Element_______ Position______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:____________________________

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 99

Manuf.___________ Style Model }___________ Class Form }_____

Dwg. No.______ Group List }____ Spec'n.__________ Cycles______

Service______________ Element_______ Position______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:____________________________

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE Nº 100

Manuf.___________ Style Model }___________ Class Form }_____

Dwg. No.______ Group List }____ Spec'n.__________ Cycles______

Service______________ Element_______ Position______

CONTACTS { Normal (d)___(i)___ ‖ Reverse (d)___(i)_____
Front (d)___(i)___ ‖ Back (d)___(i)_____
De-energized______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM } $\frac{W}{PU}$ X 100					
% DROP-AWAY MINIMUM } $\frac{DA}{PU}$ X 100					

REMARKS:____________________________

(CONT'D ON PAGE 30)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 101

Manuf. U.S. & S.Co. Style/Model 15 Class/Form ____

Dwg. No. C8813 Group/List ____ Spec'n. 1207 Cycles 60

Service Line Element 2 Position 3

CONTACTS Normal (d) 4 (i) ___ Reverse (d) 4 (i) ____

Front (d) ___ (i) ___ Back (d) ___ (i) ____

De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.4	.046
Volt-Amperes	44.	5.06
Watts	11.	
Power Factor	.764	.4
Impedance (Ohms)	275.	2390.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	37.8	37.8	39.6	39.6
	Amps.	.016	.016	.017	.017
PICK-UP (Min.)	Volts	34.2	34.2	32.4	32.4
	Amps.	.014	.014	.013	.013
WORKING (Max.)	Volts	105.	105.	110.	110.
	Amps.	.044	.044	.046	.046
WORKING (Min.)	Volts	95.	95.	90.	90.
	Amps.	.039	.039	.037	.037
DROP-AWAY (Min.)	Volts	27.4	27.4	23.4	23.4
	Amps.	.011	.011	.009	.009
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		291	291	305	305
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		80	80	70	70

REMARKS: ____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 102

Manuf. U.S. & S.Co. Style/Model 15 Class/Form ____

Dwg.No. C8813 Group/List ____ Spec'n. 749 Cycles 60

Service Line Element 1 Position 2

CONTACTS Normal (d) ___ (i) ___ Reverse (d) ___ (i) ____

Front (d) 6 (i) ___ Back (d) 6 (i) ____

De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.19
Volt-Amperes		20.9
Watts		
Power Factor		.60
Impedance (Ohms)		579.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	84.		88.	
	Amps.	.158		.165	
PICK-UP (Min.)	Volts	76.		72.	
	Amps	.142		.135	
WORKING (Max.)	Volts	110.		115.	
	Amps.	.189		.198	
WORKING (Min.)	Volts	99.7		94.6	
	Amps.	.170		.160	
DROP-AWAY (Min.)	Volts	72.1		61.1	
	Amps.	.135		.114	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		138		144	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		95		85	

REMARKS: ____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 103

Manuf. ____ Style/Model ____ Class/Form ____

Dwg.No. ____ Group/List ____ Spec'n. ____ Cycles ____

Service ____ Element ____ Position ____

CONTACTS Normal (d) ___ (i) ___ Reverse (d) ___ (i) ____

Front (d) ___ (i) ___ Back (d) ___ (i) ____

De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ____

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 104

Manuf. ____ Style/Model ____ Class/Form ____

Dwg. No. ____ Group/List ____ Spec'n. ____ Cycles ____

Service ____ Element ____ Position ____

CONTACTS Normal (d) ___ (i) ___ Reverse (d) ___ (i) ____

Front (d) ___ (i) ___ Back (d) ___ (i) ____

De-energized ____

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. ___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ____

(CONT'D ON PAGE 31)

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 105

Manuf. U.S.&S.Co. Style/Model 15 Class/Form ----

Dwg. No. C8813 Group List ---- Spec'n. 737 Cycles 60

Service Indicator Element 2 Position 3

CONTACTS Normal (d) 5 (i) ---- Reverse (d) 5 (i) ----
Front (d) ---- (i) ---- Back (d) ---- (i) ----
De-energized 1-Buffer

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	110.
Amperes	.61	.05
Volt-Amperes	67.	5.5
Watts	14.	
Power Factor	.21	
Impedance (Ohms)	180.	2200.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	57.8	57.8	60.5	60.5
	Amps.	.026	.026	.027	.027
PICK-UP (Min.)	Volts	52.2	52.2	49.5	49.5
	Amps.	.023	.023	.022	.022
WORKING (Max.)	Volts	115.	115.	121.	121.
	Amps.	.052	.052	.055	.055
WORKING (Min.)	Volts	104.	104.	99.1	99.1
	Amps.	.047	.047	.045	.045
DROP-AWAY (Min.)	Volts	41.7	41.7	34.6	34.6
	Amps.	.018	.018	.015	.015
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		209	209	220	220
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		80	80	70	70

REMARKS: ----

S.C.20

(See Instructions No. 40)

A. C. RELAY REQUIREMENTS—TABLE № 106

Manuf. U.S.&S.Co. Style/Model 15 Class/Form ----

Dwg.No. C8813 Group List ---- Spec'n. 1122 Cycles 25

Service Indicator Element 2 Position 3

CONTACTS Normal (d) 6 (i) ---- Reverse (d) 6 (i) ----
Front (d) ---- (i) ---- Back (d) ---- (i) ----
De-energized ----

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	50.	50.
Amperes	.95	.085
Volt-Amperes	47.5	4.25
Watts	10.	
Power Factor	.21	
Impedance (Ohms)	52.5	588.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	18.9	18.9	19.8	19.8
	Amps.	.031	.031	.033	.033
PICK-UP (Min.)	Volts	17.1	17.1	16.2	16.2
	Amps.	.028	.028	.027	.027
WORKING (Max.)	Volts	52.5	52.5	55.	55.
	Amps.	.089	.089	.093	.093
WORKING (Min.)	Volts	47.5	47.5	45.	45.
	Amps.	.080	.080	.076	.076
DROP-AWAY (Min.)	Volts	15.4	15.4	13.	13.
	Amps.	.025	.025	.021	.021
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		292	292	306	306
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		90	90	80	80

REMARKS: ----

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 107

Manuf. ---- Style/Model ---- Class/Form ----

Dwg.No. ---- Group List ---- Spec'n. ---- Cycles ----

Service ---- Element ---- Position ----

CONTACTS Normal (d) ---- (i) ---- Reverse (d) ---- (i) ----
Front (d) ---- (i) ---- Back (d) ---- (i) ----
De-energized ----

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. ----		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU}$ x 100					
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100					

REMARKS: ----

S.C.20

(See Instructions No. 40)

A.G. RELAY REQUIREMENTS—TABLE № 108

Manuf. U.S.&S.Co. Style/Model 15 Class/Form ----

Dwg. No. C8813 Group List ---- Spec'n. 1332 Cycles 60

Service L.O. Element 2 Position 2

CONTACTS Normal (d) ---- (i) ---- Reverse (d) ---- (i) ----
Front (d) 4 (i) ---- Back (d) 2 (i) ----
De-energized ----

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	5.4
Amperes	.40	.154
Volt-Amperes	44.	.831
Watts	11.	
Power Factor	.25	
Impedance (Ohms)	275.	35.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	1.4		1.46	
	Amps.	.040		.042	
PICK-UP (Min.)	Volts	1.26		1.20	
	Amps.	.036		.034	
WORKING (Max.)	Volts	5.66		5.95	
	Amps.	.162		.170	
WORKING (Min.)	Volts	5.12		4.85	
	Amps.	.146		.138	
DROP-AWAY (Min.)	Volts	1.13		.96	
	Amps.	.032		.027	
% WORKING MAXIMUM $\frac{W}{PU}$ x 100		425		447	
% DROP-AWAY MINIMUM $\frac{DA}{PU}$ x 100		.90		80	

REMARKS: ----

(CONT'D ON PAGE 32)

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 109

Manuf. U.S. & S.Co. Style/Model Iron Galv. Class/Form ----

Dwg. No. C6372 Group List ---- Spec'n. 63 Cycles 60

Service Line Element 1 Position 2

CONTACTS Normal (d) -- (i) -- Reverse (d) -- (i) --
Front (d) -- (i) 2 Back (d) -- (i) --
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.16
Volt-Amperes		17.6
Watts		
Power Factor		
Impedance (Ohms)		687.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	69.3		72.5	
	Amps.	.136		.143	
PICK-UP (Min.)	Volts	62.5		59.4	
	Amps.	.123		.112	
WORKING (Max.)	Volts	115.		121.	
	Amps.	.168		.176	
WORKING (Min.)	Volts	104.		99.	
	Amps.	.152		.144	
DROP-AWAY (Min.)	Volts	50.		41.5	
	Amps.	.098		.078	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		174		183	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		80		70	

REMARKS: ------

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 110

Manuf. U.S. & S.Co. Style/Model Galv. Class/Form ----

Dwg. No. C7361 Group List ---- Spec'n. 249 Cycles 60

Service Track Element 2 Position 2

CONTACTS Normal (d) -- (i) -- Reverse (d) -- (i) --
Front (d) 4 (i) -- Back (d) 2 (i) --
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.5
Amperes	.45	2.5
Volt-Amperes	49.5	1.25
Watts		
Power Factor		
Impedance (Ohms)	244.	.20
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.178		.187	
	Amps.	1.05		1.1	
PICK-UP (Min.)	Volts	.161		.153	
	Amps.	.95		.90	
WORKING (Max.)	Volts	.525		.55	
	Amps.	2.62		2.75	
WORKING (Min.)	Volts	.474		.45	
	Amps.	2.37		2.25	
DROP-AWAY (Min.)	Volts	.129		.107	
	Amps.	.76		.63	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		308		324	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		80		70	

REMARKS: ------

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 111

Manuf. U.S. & S.Co. Style/Model Rad. Poly. Class/Form ----

Dwg. No. C7967 Group List ---- Spec'n. 438 Cycles 60

Service Track Element 2 Position 3

CONTACTS Normal (d) 4 (i) -- Reverse (d) 4 (i) --
Front (d) -- (i) -- Back (d) -- (i) --
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.55
Amperes	.145	.60
Volt-Amperes	15.9	.33
Watts	14.	
Power Factor	.88	
Impedance (Ohms)	760.	.916
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.345	.345	.360	.360
	Amps.	.379	.379	.396	.396
PICK-UP (Min.)	Volts	.255	.255	.240	.240
	Amps.	.280	.280	.264	.264
WORKING (Max.)	Volts	.632	.632	.660	.660
	Amps.	.690	.690	.720	.720
WORKING (Min.)	Volts	.466	.466	.440	.440
	Amps.	.510	.510	.480	.480
DROP-AWAY (Min.)	Volts	.153	.153	.120	.120
	Amps.	.168	.168	.132	.132
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		210	210	220	220
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		60	60	50	50

REMARKS: ------

S.C. 20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 112

Manuf. U.S. & S.Co. Style/Model Radial Class/Form ----

Dwg. No. C7967 Group List ---- Spec'n. 548 Cycles 60

Service Track Element 2 Position 3

CONTACTS Normal (d) 4 (i) -- Reverse (d) 4 (i) --
Front (d) -- (i) -- Back (d) -- (i) --
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	15.	.60
Amperes	.73	.63
Volt-Amperes	10.95	.378
Watts	9.5	
Power Factor	.866	
Impedance (Ohms)	20.5	.95
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 1		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.380	.380	.396	.396
	Amps.	.400	.400	.420	.420
PICK-UP (Min.)	Volts	.280	.280	.264	.264
	Amps.	.297	.297	.280	.280
WORKING (Max.)	Volts	.690	.690	.720	.720
	Amps.	.725	.725	.755	.755
WORKING (Min.)	Volts	.510	.510	.480	.480
	Amps.	.544	.544	.504	.504
DROP-AWAY (Min.)	Volts	.168	.168	.132	.132
	Amps.	.178	.178	.140	.140
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		209	209	218	218
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		60	60	50	50

REMARKS: ------

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S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 113

Manuf. U.S. & S.Co. Style/Model SLV-13 Class/Form ____
Dwg. No. C3707 Group/List ____ Spec'n. 467 Cycles 60
Service Line Element 1 Position 2
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)____
CONTACTS Front (d)___(i) 2 Back (d)___(i)____
CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		110.
Amperes		.25
Volt-Amperes		27.5
Watts		14.
Power Factor		.51
Impedance (Ohms)		440.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	80.9		84.7	
	Amps.	.184		.192	
PICK-UP (Min.)	Volts	73.		69.2	
	Amps.	.166		.157	
WORKING (Max.)	Volts	94.5		99.	
	Amps.	.214		.224	
WORKING (Min.)	Volts	85.5		81.	
	Amps.	.194		.183	
DROP-AWAY (Min.)	Volts	65.5		55.4	
	Amps.	.149		.125	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		122		128	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 114

Manuf. U.S. & S.Co. Style/Model Centrif'l. Class/Form ____
Dwg. No. C8104 Group/List ____ Spec'n. 1405 Cycles 60
Service Track Element 2 Position 2
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)____
CONTACTS Front (d) 4 (i)___ Back (d) 4 (i)____
CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts	110.	.47
Amperes	.30	1.88
Volt-Amperes	33.	.885
Watts	32.	
Power Factor	.97	.47
Impedance (Ohms)	366.	.25
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg.40 (Pg.4) Fig. 3		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	.40		.42	
	Amps.	1.57		1.65	
PICK-UP (Min.)	Volts	.36		.34	
	Amps.	1.42		1.35	
WORKING (Max.)	Volts	.49		.52	
	Amps.	1.97		2.07	
WORKING (Min.)	Volts	.44		.42	
	Amps.	1.78		1.69	
DROP-AWAY (Min.)	Volts	.32		.27	
	Amps.	1.27		1.08	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		129		137	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		90		80	

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 115

Manuf. ______ Style/Model ______ Class/Form ____
Dwg. No. ______ Group/List ____ Spec'n. ______ Cycles ____
Service ______ Element ______ Position ____
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)____
CONTACTS Front (d)___(i)___ Back (d)___(i)____
CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE № 116

Manuf. ______ Style/Model ______ Class/Form ____
Dwg. No. ______ Group/List ____ Spec'n. ______ Cycles ____
Service ______ Element ______ Position ____
CONTACTS Normal (d)___(i)___ Reverse (d)___(i)____
CONTACTS Front (d)___(i)___ Back (d)___(i)____
CONTACTS De-energized ______

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg.4) Fig.___		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ______

(CONT'D ON PAGE 34)

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 117

Manuf. U.S. & S.Co. Style/Model ANL-30 Class/Form ----

Dwg. No B12635 Group/List ---- Spec'n. 1717 Cycles 60

Service Power Off Element 1 Position 2

CONTACTS
Normal (d)--(i)-- Reverse (d)--(i)----
Front (d) 2 (i)-- Back (d) 2 (i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		8.
Amperes		.22
Volt-Amperes		1.76
Watts		
Power Factor		.43
Impedance (Ohms)		36.3
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	7.15		7.47	
	Amps.	.197		.206	
PICK-UP (Min.)	Volts	5.85		5.51	
	Amps.	.161		.152	
WORKING (Max.)	Volts	8.8		9.2	
	Amps.	.264		.275	
WORKING (Min.)	Volts	7.2		6.8	
	Amps.	.176		.165	
DROP-AWAY (Min.)	Volts	4.1		3.3	
	Amps.	.113		.091	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		135		141	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		60	

REMARKS: ----

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 118

Manuf. U.S. & S.Co. Style/Model ANL-30 Class/Form ----

Dwg. No. B12635 Group/List ---- Spec'n. 1805 Cycles 60

Service Power Off Element 1 Position 2

CONTACTS
Normal (d)--(i)-- Reverse (d)--(i)----
Front (d) 2 (i)-- Back (d) 2 (i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		12.
Amperes		.15
Volt-Amperes		1.8
Watts		
Power Factor		.43
Impedance (Ohms)		80.
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. 2		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts	10.7		11.2	
	Amps.	.133		.140	
PICK-UP (Min.)	Volts	8.77		8.29	
	Amps.	.110		.104	
WORKING (Max.)	Volts	13.2		13.8	
	Amps.	.180		.187	
WORKING (Min.)	Volts	10.8		10.2	
	Amps.	.120		.112	
DROP-AWAY (Min.)	Volts	6.15		4.97	
	Amps.	.077		.062	
% WORKING MAXIMUM $\frac{W}{PU} \times 100$		135		141	
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$		70		60	

REMARKS: ----

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 119

Manuf. ---- Style/Model ---- Class/Form ----

Dwg. No. ---- Group/List ---- Spec'n. ---- Cycles ----

Service ---- Element ---- Position ----

CONTACTS
Normal (d)--(i)-- Reverse (d)--(i)----
Front (d)--(i)-- Back (d)--(i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ----		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ----

S.C.20

(See Instructions No. 40)

A.C. RELAY REQUIREMENTS—TABLE No 120

Manuf. ---- Style/Model ---- Class/Form ----

Dwg. No. ---- Group/List ---- Spec'n. ---- Cycles ----

Service ---- Element ---- Position ----

CONTACTS
Normal (d)--(i)-- Reverse (d)--(i)----
Front (d)--(i)-- Back (d)--(i)----
De-energized ------

NOMINAL OR RATED	LOCAL ELEMENT	CONTROLLED ELEMENT
Volts		
Amperes		
Volt-Amperes		
Watts		
Power Factor		
Impedance (Ohms)		
Phase Angle of Element		

OPERATING CHARACTERISTICS

Tests made in accordance with Dwg. 40 (Pg. 4) Fig. ----		SHOP TEST		FIELD TEST	
		Normal	Reverse	Normal	Reverse
PICK-UP (Max.)	Volts				
	Amps.				
PICK-UP (Min.)	Volts				
	Amps.				
WORKING (Max.)	Volts				
	Amps.				
WORKING (Min.)	Volts				
	Amps.				
DROP-AWAY (Min.)	Volts				
	Amps.				
% WORKING MAXIMUM $\frac{W}{PU} \times 100$					
% DROP-AWAY MINIMUM $\frac{DA}{PU} \times 100$					

REMARKS: ----

(CONT'D ON PAGE ------)

Was Pl. 54, Issue: 1 (6-7-33) Renumbered 044, Issue: 1 of 3-31-36, Retaining SC-45 added SC-44, removed SC-54. elsewhere, above Issue: 1 changed to 'A' 4-16-42

044B (9-30-1942) Removed canceled Form SC-44

NYCS
SC-45

NEW YORK CENTRAL SYSTEM

SIGNAL ELECTRIC LAMPS

SH._____ OF._____

SECTION.________________ DIVISION.________________

SIGNAL		Estimated hrs. burned per day	DATE			BURNING HOURS		Voltage at lamp. Lamp burning	Item No. (Inst'n 750)	Manuf.	Method of lighting
Number	Indication		Installed	To be renewed	Burned out	Burned	Expected				

Date.____________ 19____ Signed: ____________

0 1 2 3
Scale & all dimensions given in inches

FORM SC-45
Railroad Manila 8 x 10½
(Pads of 50 glued at top)

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FORM

SIGNAL ELECTRIC LAMPS SC-45

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

044B
3-31-1936
9-30-1942

Approved by Representatives of Lines shown.
Chairman

GENERAL.

1 Tool Board and Equipment in accordance with N. Y. C. L., S. & T. C. C. Plan 2000 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

2 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

3 Materials, tools or supplies must be stored in places provided for that purpose.

4 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

5 Apparatus must be painted as often as required to prevent deterioration.

6 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

7 Gaskets must be kept in good condition.

8 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

9 Ventilators, when in use, must be kept clean to allow free circulation of air.

10 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

11 Parts found defective or not meeting tests required by these instructions must be replaced.

12 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these instructions.

13 Batteries must be maintained in accordance with N. Y. C. L., S. & T. C. C. Instructions.

14 Wiring must be maintained in accordance with N. Y. C. L., S. & T. C. C. Instructions.

15 Signals must be maintained in accordance with N. Y. C. L., S. & T. C. C. Instructions.

16 Electric locks must be maintained in accordance with N. Y. C. L., S. & T. C. C. Instructions No. 20.

17 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

18 Cotters must be of proper size, kept in place, in good condition and properly spread.

19 Testing device for testing fuses before they are used must be kept in place.

20 Fuses of specified capacity and type must be used and a sufficient supply of tested Fuses kept on hand.

TIME RELEASE AND TIME RELAYS.

21 Time releases and time relays must be adjusted and maintained to provide time interval specified.

23 They must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS.

24 Contact springs must be adjusted with sufficient pressure so that contact resistance does not exceed 0.01 ohm. Contact surface must be kept clean, without excessive wear and free from pits and burns.

25 Contact adjustments must be maintained as specified on circuit plans.

26 Movement of controller contactor with lever in fixed position must not exceed 3/32 inch.

27 Insulating and other parts must be kept clean and be free of metallic particles caused by wear.

28 Inspection must be made for burned, weakened or other defected parts.

GROUND TESTS.

29 Ground tests between positive and ground and negative and ground must be made each day maintainer is on duty, and readings recorded on Form NYCS/SC-29.

30 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

31 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

CHANGES OR REPLACEMENTS.

32 When replacements or changes are made in switch operating and locking mechanism, signals, cross protection relays, or other parts of the interlocking, tests must be made immediately after they are placed in service to determine that they operate properly and meet the requirements of these instructions.

INTERLOCKING MACHINE.

33 Machine cabinet must be kept in good condition. Sections equipped with locking devices must be kept locked.

34 Interlocking machine must be kept clean and free from rust.

35 Mechanical locking must be in accordance with the current locking sheet and dog chart and must be maintained in accordance with N. Y. C. L., S. & T. C. C. Instructions.

36 Levers must operate without undue friction.

37 Lever blocks and markers as shown on N. Y. C. L., S. & T. C. C. Plans 2310 and 2311 must be placed on operating levers that are temporarily not to be operated, or operated with proper precaution. Sufficient number must be available for use as required.

38 Indication mechanism must be tested at least each 6 months to determine that no mechanical or other defects exist which will permit lever (single or double) to be moved beyond indication position until proper indication has been received. Tests shall be made by moving lever several times from full normal and full reverse positions to the indication positions at varying impacts against indication stop. When testing indication mechanism of lever the indication circuit must be opened during test. If any conditions are found that may cause improper operations signalman must be notified immediately, lever blocks, or markers, placed on lever and precautions taken to provide for the safe passage of trains.

ELECTRIC SWITCH OPERATING AND LOCKING MECHANISM.

39 Mechanism must be kept clean, inside of case free from grit, foreign matter and excessive oil.

40 Mechanism wiring must be in good condition and arranged to avoid mechanical injury.

41 Switch timbers supporting the switch operating and locking mechanisms must be well tamped to prevent excessive vibration and strains caused by passing trains.

42 Lock and point detector rods must be maintained with minimum lost motion.

43 Mechanism must be operated by hand after repairs, adjustments or replacements are made to determine that there is no undue strain on any part of machine and that it operates properly.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

—INSTRUCTIONS—
ELECTRIC INTERLOCKING

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

47

ISSUE	DATE
1	10-6-1933

Approved by Representatives of Lines shown.
J E Mock
Chairman

WAH

(CONT'D ON PAGE 2)

44 When repairs, adjustments or replacements are complete or any part of the wiring has been disconnected and mechanism is again ready for service, it must be operated to full normal and full reverse position by its interlocking lever to determine that the switch operating and locking mechanism and indications operate properly and that the movement of the switch follows the movement of its lever.

45 Mechanisms held for emergency use must be kept in good order ready for immediate use.

46 Mechanisms taken out of service for repairs must be disassembled and parts thoroughly cleaned. Wearing surfaces must be examined for wear and evidence of cutting, giving special attention to the motor armature pinion or shaft bearing surfaces. Oil ducts and oil holes must be thoroughly cleaned to insure that wearing parts will be properly lubricated. Current carrying parts must test infinity resistance as between conductors and ground when tested with a megger. The contacts of circuit controllers must be examined and adjusted as required in Instruction 24.

Re-assembled mechanisms must be in good condition, properly lubricated and wiring arranged to avoid mechanical injury. The mechanisms must then be operated by hand to full normal and full reverse position to determine that it operates properly without undue friction.

47 Guide plates for operating bar must not permit of more than 1/16 in. clearance between bar and guide plate.

48 Insulating block for brush holders must be clean and the head of binding posts sealed with insulating compound to prevent electrical leakage.

49 Edges of locking dogs and rods must be maintained with not more than 1/16 in. wear.

50 Guards must be kept in place and in good condition.

51 Connection of motor field coils must not be changed except as instructed by the Signal Supervisor.

52 Contacts of circuit controllers must be inspected frequently to determine if adjusted as required in Instruction 24. Wearing surfaces of slide type controllers must be lubricated by wiping with lint free cloth dampened with signal mechanism oil.

53 Pole changer must be maintained to insure that switch mechanism follows movement of lever by reversing position of lever before switch has completed its stroke. Test to be made for both normal and reverse operation.

54 Point detector must be maintained so that with the switch mechanism locked in normal and/or reverse position it is not possible to open contacts by applying force at the switch points in either direction. Contacts must remain open with ¼ in. obstruction between switch point and stock rail, approximately 6 in. from point.
The machine is to be operated by hand-crank.

55 Switch mechanisms must be maintained so that they meet the requirements shown in Table, page 3. The clutch slippage shall be tested by placing an obstruction between the switch point and stock rail.

MOTOR COMMUTATORS AND BRUSHES.

56 Commutators must be smooth, clean and free from oil or grease and have a glossy appearance. When necessary to clean, chamois skin or soft cloth free from lint must be used. Commutators that become rough and cause excessive sparking must be polished with Blitz cloth or other mildly abrasive approved polishing cloth. Emery or carborundum must not be used. Commutators defective or requiring resurfacing must be replaced.

57 Brushes must be of quality and design approved by the Signal Engineer. They must be clean, in proper alignment, move freely in holder or holder move freely on stud, and shaped to fit and rest with full contact surface on commutator or slip rings.

58 Springs must be in place and in good condition to provide proper contact pressure.

59 Worn brushes must be replaced before loss of brush pressure, fouling or binding of brush holder. New brushes must be fitted by drawing No. 00 or finer sand paper between brush and commutator with smooth side of paper toward commutator or slip ring. When brushes have been fitted, parts must be carefully cleaned of dust and grit.

LUBRICATION.

60 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that service.

61 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

62 Housing and parts on which forced lubricant is used must be thoroughly cleaned with a non-explosive cleaning solvent at least once each year and new lubricant applied.

63 Where parts are equipped for forced lubrication the parts should be lubricated as often as necessary to provide continuous lubrication of wearing surfaces. Care must be used to know that sufficient pressure is applied to insure that lubricant is forced to all parts of wearing surfaces. When lubricating the lower end of motor spindle of vertical type motors, sufficient lubricant must be forced into bearing to lift armature slightly.

64 Parts not equipped for forced lubrication should be lubricated with an approved grade of oil.

65 Small pins and pivot bearings must be lubricated with signal mechanism oil.

66 Manufacturer's instructions for lubrication must be followed; the kind and grade of lubricant used first being approved by the Signal Engineer.

POWER OPERATED SWITCH—Adjustments.

67 Switch must be adjusted as follows:

(a) Loosen check and adjusting nuts on switch adjustments. Set switch in position to adjust long bar of lock rod.
Bring the notch in bar in line with lock plunger of switch movement. Turn adjusting nut until switch point is tight against main or stock rail, then adjust long lock bar so that its locking notch will line with lock plunger.

(b) Reverse switch and turn adjusting nut until point is tight against main or stock rail. Adjust short bar of lock rod so that its locking notch will line with lock plunger.

(c) Set jam nuts with wrench, tightly against adjusting nuts.

68 Operating rod must be adjusted as follows:

(a) Adjust rod so that switch or frog points fit tightly against stock rails, without excessive pressure, or spring, in both normal and reverse positions.

(b) Make test for this adjustment by operating switch machine by hand.

(c) Set jam nuts with wrench tightly against adjusting nuts.

69 Lock rod must be adjusted as follows:

(a) See that notches in lock rods have dimensions in accord with those shown on standard plans.

(b) Permanently mark for visual indication (when notch is centered with locking dog) rods having notches that are invisible in locking position.

(c) Operate switch by hand to full normal and full reverse position and note that locking dog when entering in locking position is centered in notch.

(d) Set jam nuts, with wrench, tightly against adjusting nuts.

(e) Adjustments on lock rods must be maintained so that switch mechanism will not lock when ¼ in. obstruction is placed between switch point and stock rail, approximately 6 in. from point. The machine is to be operated by hand-crank.

(CONT'D ON PAGE 3)

44 When repairs, adjustments or replacements are complete or any part of the wiring has been disconnected and mechanism is again ready for service, it must be operated to full normal and full reverse position by its interlocking lever to determine that the switch operating and locking mechanism and indications operate properly and that the movement of the switch follows the movement of its lever.

45 Mechanisms held for emergency use must be kept in good order ready for immediate use.

46 Mechanisms taken out of service for repairs must be disassembled and parts thoroughly cleaned. Wearing surfaces must be examined for wear and evidence of cutting, giving special attention to the motor armature pinion or shaft bearing surfaces. Oil ducts and oil holes must be thoroughly cleaned to insure that wearing parts will be properly lubricated. Current carrying parts must test infinity resistance as between conductors and ground when tested with a megger. The contacts of circuit controllers must be examined and adjusted as required in Instruction 24.

Re-assembled mechanisms must be in good condition, properly lubricated and wiring arranged to avoid mechanical injury. The mechanisms must then be operated by hand to full normal and full reverse position to determine that it operates properly without undue friction.

47 Guide plates for operating bar must not permit of more than 1/16 in. clearance between bar and guide plate.

48 Insulating block for brush holders must be clean and the head of binding posts sealed with insulating compound to prevent electrical leakage.

49 Edges of locking dogs and rods must be maintained with not more than 1/16 in. wear.

50 Guards must be kept in place and in good condition.

51 Connection of motor field coils must not be changed except as instructed by the Signal Supervisor.

52 Contacts of circuit controllers must be inspected frequently to determine if adjusted as required in Instruction 24. Wearing surfaces of slide type controllers must be lubricated by wiping with lint free cloth dampened with signal mechanism oil.

53 Pole changer must be maintained to insure that switch mechanism follows movement of lever by reversing position of lever before switch has completed its stroke. Test to be made for both normal and reverse operation.

54 Point detector must be maintained so that with the switch mechanism locked in normal and/or reverse position it is not possible to open contacts by applying force at the switch points in either direction. Contacts must remain open with ¼ in. obstruction between switch point and stock rail, approximately 6 in. from point.
The machine is to be operated by hand-crank.

55 Switch mechanisms must be maintained so that they meet the requirements shown in Table, page 3. The clutch slippage shall be tested by placing an obstruction between the switch point and stock rail.

MOTOR COMMUTATORS AND BRUSHES.

56 Commutators must be smooth, clean and free from oil or grease and have a glossy appearance. When necessary to clean, chamois skin or soft cloth free from lint must be used. Commutators that become rough and cause excessive sparking must be polished with Blitz cloth or other mildly abrasive approved polishing cloth. Emery or carborundum must not be used. Commutators defective or requiring resurfacing must be replaced.

57 Brushes must be of quality and design approved by the Signal Engineer. They must be clean, in proper alignment, move freely in holder or holder move freely on stud, and shaped to fit and rest with full contact surface on commutator or slip rings.

58 Springs must be in place and in good condition to provide proper contact pressure.

59 Worn brushes must be replaced before loss of brush pressure, fouling or binding of brush holder. New brushes must be fitted by drawing No. 00 or finer sand paper between brush and commutator with smooth side of paper toward commutator or slip ring. When brushes have been fitted, parts must be carefully cleaned of dust and grit.

LUBRICATION.

60 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that service.

61 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

62 Housing and parts on which forced lubricant is used must be thoroughly cleaned with a non-explosive cleaning solvent at least once each year and new lubricant applied.

63 Where parts are equipped for forced lubrication the parts should be lubricated as often as necessary to provide continuous lubrication of wearing surfaces. Care must be used to know that sufficient pressure is applied to insure that lubricant is forced to all parts of wearing surfaces. When lubricating the lower end of motor spindle of vertical type motors, sufficient lubricant must be forced into bearing to lift armature slightly.

64 Parts not equipped for forced lubrication should be lubricated with an approved grade of oil.

65 Small pins and pivot bearings must be lubricated with signal mechanism oil.

66 Manufacturer's instructions for lubrication must be followed; the kind and grade of lubricant used first being approved by the Signal Engineer.

POWER OPERATED SWITCH—Adjustments.

67 Switch must be adjusted as follows:

(a) Loosen check and adjusting nuts on switch adjustments. Set switch in position to adjust long bar of lock rod.
Bring the notch in bar in line with lock plunger of switch movement.
Turn adjusting nut until switch point is tight against main or stock rail, then adjust long lock bar so that its locking notch will line with lock plunger.

(b) Reverse switch and turn adjusting nut until point is tight against main or stock rail. Adjust short bar of lock rod so that its locking notch will line with lock plunger.

(c) Set jam nuts with wrench, tightly against adjusting nuts.

68 Operating rod must be adjusted as follows:

(a) Adjust rod so that switch or frog points fit tightly against stock rails, without excessive pressure, or spring, in both normal and reverse positions.

(b) Make test for this adjustment by operating switch machine by hand.

(c) Set jam nuts with wrench tightly against adjusting nuts.

69 Lock rod must be adjusted as follows:

(a) See that notches in lock rods have dimensions in accord with those shown on standard plans.

(b) Permanently mark for visual indication (when notch is centered with locking dog) rods having notches that are invisible in locking position.

(c) Operate switch by hand to full normal and full reverse position and note that locking dog when entering in locking position is centered in notch.

(d) Set jam nuts, with wrench, tightly against adjusting nuts.

(e) Adjustments on lock rods must be maintained so that switch mechanism will not lock when ¼ in. obstruction is placed between switch point and stock rail, approximately 6 in. from point. The machine is to be operated by hand-crank.

(CONT'D ON PAGE 3)

G. R. S. CO. TYPES

INDICATION MECHANISMS

70 Indication parts must be removed for examination in accordance with schedule approved by the Signal Engineer. The lever, lever guide and indication parts in Model 2 and 2 unit lever machines must be removed and the indication latch, L-dog, latch spring, cam and cam spring must be replaced with parts approved for use. Parts replaced must be sent to a designated point for gauging and such parts that are fit for use must be returned to stock. Notches for indications and electric locks must be examined for rounded or otherwise distorted locking edges. Lever guides must be carefully examined to determine that pins and studs are in good condition and tight and that guide is not cracked or broken. Levers must be carefully examined for defects and wear. The overall width of a new lever is 1⅞ in. and when wear of 1/32 in. in main body of lever or on ends of any indication detents is detected lever must be replaced. The indication assembly on Model 5 machines must be removed and its parts carefully inspected for wear and breakage. Such parts which are worn enough to possibly permit lever to move past indication position (without indication first being received) must be replaced, the parts properly lubricated and then reassemble. After the assembly has been replaced on lever mechanical test must be made in accordance with Instructions 38 and 71.

71 Levers when assembled and placed in the machine must be tested in accordance with Instruction 38, (25 movements against normal and reverse indication stops shall be minimum for this test). Electrical test must then be made to determine that indication magnets operate properly and meet operating requirements of indication magnets shown on page 3. If operating values do not meet those shown on page 3 tension on latch spring must be adjusted and lever retested as indicated in Instructions 38 and 70.

72 Indication selectors and cross protection relays must be clean, armature mechanically free, wire connections tight and contacts free from pits.

CROSS PROTECTION TESTS.

73 Cross protection tests must be made by the Maintainer at least once each 6 months by applying a cross of 20 ohms resistance between normal and reverse control wires at each switch operating and locking mechanism to determine that cross protection is effective before motor starts. This test must be made with lever in full normal and then again with lever in full reverse position. Cross protection relays must not be operated electrically or by hand before making test. After each test and before making additional tests the switch must be operated by lever.

74 Inspector or other designated employe must test cross protection on switches and signals yearly.

(a) To test switch operating and locking mechanism, connect rheostat and ammeter between normal and reverse operating wires at switch and gradually increase current until cross protection relay operates. Cross protection relay must operate before motor starts and the current reading at which cross protection relay operates must not exceed 4.0 amperes for 110 volt and 2.0 amperes for 220 volt machines.

(b) To test semaphore signals, connect rheostat and ammeter in series between positive wire of operating battery and operating wire at signal and gradually increase current until cross protection relay operates. Cross protection relay must operate before motor or solenoid starts and the current reading at which cross protection relay operates must not exceed 4.0 amperes for 110 volt solenoid dwarf and 0.5 amperes for motor, High or Dwarf signals.

(c) Current readings at which cross protection is effective for tests in instructions 74, (a)-(b) must be recorded on Form $\frac{\text{NYCS}}{\text{SC-28}}$

CROSS PROTECTION RELAY AND INDICATION MAGNET TESTS.

75 Inspector or other designated employe must test each cross protection relay and indication magnet at least each year and current values and other data required recorded on Form $\frac{\text{NYCS}}{\text{SC-28}}$ An independent low voltage battery is desirable for test energy.

76 Relays and indication magnets must be tested in place on interlocking machine.

77 Battery, ammeter and shunt rheostat must be connected the same as in making Pick-up and Drop-away tests at other D. C. apparatus.

78 Visual inspection must be made to note that armature bearings and other parts are free of rust or foreign matter.

79 Contacts must make evenly and simultaneously and have proper tension when closed.

80 Adjustments must be made to meet operating requirements. Where operating requirements cannot be obtained by adjustment, the relay or indication magnet must be replaced.

81 Cross protection relay must operate to open position on current value of not more than 25 per cent above value shown on name plate.

82 Where operating values are not shown on name plate, values must be obtained from proper authority and permanently marked on relay.

83 Values at which indication magnets operate must be in accordance with those shown on page 3.

(CONT'D ON PAGE 5)

G. R. S. CO. AND U. S. & S. CO. TYPES

SWITCH OPERATING AND LOCKING MECHANISM CONTROLLERS FOR BUS TYPE INTERLOCKINGS

GENERAL

100 Maintainer must, at least once each month, inspect the controllers, wiring and contacts.

101 Operating requirements must be maintained as shown in Table, page 3. Periodical tests being made to determine that the requirements are met.

102 Controllers must be kept clean, and inside free as practicable from moisture. Case, base plate and similar non-working parts must be painted as required to prevent rusting.

103 Paint must not be applied to working parts or insulation. Only approved paint (U. S. & S. Co. Grade 81-E) may be applied to porcelain top plates.

D. C. CONTROLLERS, TYPES F, D AND C—U. S. & S. CO.

104 Oil must not be applied to controllers, except as specified. Rollers, shafts and pivots must operate freely without excessive lost motion.

105 Contact surfaces must meet squarely, be clean, free from pits and burns, and when closed, have proper tension, and compression of not less than 1/32 in.

106 Maintainer must examine the bearings of polar armature, lock roller, neutral armature and contact bar, and when necessary lubricate them with signal mechanism oil.

107 Neutral armature contacts should have opening of ¼ in. when in the de-energized position, and be deflected ⅛ in. from their stops when closed.

108 De-energizing contact (36-38) opening shall be ¼ in. for the outside contacts. The inside contacts shall open at the same time as the corresponding outside contacts.

109 Circuit breaker contact opening should be ½ in. and when circuit breaker is tipped the contact spring should rest against the contact stop. In closing, the contact spring should have a vertical slide of 1/16 in. and when fully closed approximately 12 ounce contact pressure. The circuit breaker contact should be open during the entire period of bridging of the polar motor control contacts. Should the circuit breaker contact close during that time, full operating voltage would be impressed across the field winding of the switch motor resulting in a virtual short circuit.

110 Each set of polar contacts shall engage or compress equal amounts when in either extreme position.

111 Polar armature must be locked in both extreme positions by the locking arm on the neutral armature. This lock should not jar out of engagement by impact of the hand on the polar armature.

112 Relation between de-energizing polar contact and neutral armature contact adjustment must be checked at least annually by reversing the controller slowly, allowing the lock to ride on the lock roller observing that the neutral armature contacts are held closed in all positions in which the lock is riding on the roller. They must close slightly before the polar armature has moved sufficiently to open the de-energizing polar contacts. This will insure that there will be no point at which both the neutral armature contacts, and polar de-energizing contacts are open, or at which the polar contacts would be open and the lock could prevent the polar armature from completing its stroke.

113 With the polar armature set in the middle position, polar de-energizing contacts open, and the polar control circuit is closed, controller should immediately move to the proper extreme position and lock. When energized, the controller should be self-restoring to either position if the neutral armature is held up and the polar armature is reversed by hand.

114 Circuit breaker tripping device must be inspected at least each 3 months to see that pressing the trip armature down slowly will result in tripping the circuit breaker contact, then pick up the neutral armature by hand to see that the latch arm readily engages the latch pin of the circuit breaker.

115 Polar motor control contacts should occasionally be wiped with a cloth moistened with signal mechanism oil.

A. C. CONTROLLERS, MOTOR-DRIVEN—U. S. & S. CO.

116 The A. C. type controller is normally energized and should remain in last operated position with no tendency for contacts to open, if power is disconnected.

117 Indication contacts in space No. 1 shall have an initial pressure of 0.2 ounces against their stops, and shall deflect not less than 3/32 in. from their stops when in full stroke positions. When either contact is just closing, the opposite contact shall be open not less than 1/16 in.

118 Switch motor control contacts in spaces No. 2 and No. 3 shall have not less than 5/16 in. opening when in the full stroke position. In the fully closed position, contacts shall be deflected not less than 1/16 in. from their stops and shall have contact pressure of not less than 5 ounces.

119 The buffer shall be tested at least every 6 months to see that the coil spring has sufficient tension to prevent backward "drift" of the contact bar beyond center position, when the motor is started gently by hand with power off and allowed to rotate freely from the full normal or reverse locked up position. This prevents the opposite switch operating and indication contacts from closing. The buffer element which engages the roller that drives the contact bar should clear the roller approximately 3/32 in. when in either full stroke position.

120 Maintainer must keep motor shaft bearings lubricated with signal mechanism oil.

D. C. CONTROLLERS—G. R. S. CO.

121 The spring suspension system shall be so adjusted to prevent injury to the controller from vibration.

122 Contactor fingers must be adjusted so that the front contact just makes when the armature is .050 in. away from the residual pin in the top pole piece to provide the necessary contact slide. When, due to wear on the contacts there is not sufficient contact slide, the front tip of the finger should be re-adjusted and if necessary new carbon contacts replaced. With the back contact made, there should be approximately .375 in. air gap for 110 volt machines, and .150 in. for low voltage machines.

123 The centering device should be so adjusted that when both contacts are de-energized there is approximately .225 in. front contact opening and .125 in. back contact opening for 110 volt machines, and approximately .090 in. front contact opening and .045 in. back contact opening for low voltage machines.

124 When adjusting over load breaker the front contact must make before the back contact breaks and when fully picked up there must be not less than 1/32 in. air gap between finger and back contact. To secure the make before break of the contacts and necessary air gap when adjustment is changed it may be necessary to bend the back stop of the finger slightly. When adjustments are completed, tests must be made to determine that the operating values are as required in table on page 3.

125 The overload relay must be adjusted to operate in 8 to 12 seconds after the friction clutch starts to slip with normal voltage applied. For low voltage machines employing resilient gears, the relays should be adjusted to operate in 4 to 8 seconds from the time motor armature stops turning. To test relay adjustment, first determine if friction clutch (if used) is correctly set, then block machine and check relay setting for time of pick-up.

126 Defective master relays must be replaced and not repaired in the field.

(CONT'D ON PAGE____)

that signals

Signals shall be aligned, where practicable, so indications can be plainly seen by the engineman of an approaching train from a point 1,000 feet from and continuously to the signal, and, if it does not interfere with this requirement, so indications can be seen continuously from next signal in rear. Conditions that may effect the reading of a signal indication must be promptly reported to Supervisor.

3 Dwarf Signals shall be aligned, where practicable, so indications can be plainly seen by the engineman of an approaching train from a point 400 feet from and continuously to the signal.

4 Signals must be painted periodically and adjusting bolts lubricated to prevent rusting.

5 Bolts, nuts, dowel pins, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

6 Lenses, roundels, reflectors, glasses and lamps must be kept clean. Lamps must not be removed except for replacement.

7 Broken or cracked lenses of signals of the Color Light Type must be replaced as soon as practicable. If broken lens cannot be immediately replaced and is of the most restrictive indication color, signal lamp or lamps must be extinguished and lamp of required color arranged to display the most restrictive indication.

8 Where Spreadlight lenses are used they must be mounted and maintained so the beam spread is in the proper direction. When necessary to replace lenses, such replacements must be of the same kind.

9 Doors or covers must be kept tightly closed to prevent water, dust and snow from entering.

10 Wire openings must be sealed to prevent entrance of rodents, insects, etc.

11 Gaskets must be kept in good condition.

12 When necessary to replace a lamp, one of the same type, voltage and wattage must be used. Lamp replacements must be in accordance with Schedule, N. Y. C. Lines, Signal and Train Control Committee Plan 45.

13 Socket Surfaces must be clean and bright. Lamp must be pressed into socket far enough to be turned clockwise to end of slot so that contact spring may force lamp into proper place.

14 Lamp Receptacles may be changed or r set only where proper provisions have b made for refocusing.

15 Door or cover of lamp unit m closed when trains are close

SEARCHLIGHT TYPE

16 Mechanisms must be maintained in accordance with N.Y.C.L., S. & T.C.C. Instructions 25.

17 Emergency Mechanisms must be kept ready for immediate use.

18 Mechanisms must not be opened in the field. Defective mechanisms must be replaced promptly.

19 Field Energy must not exceed the values shown in the Table (pg. 8) N.Y.C.L., S.& T.C.C. Instructions 25 for D. C. Relays and Indicators by more than 25 per cent.

NYCS
SC-58
(A.A.R. SIG. SEC. 7021)

DIRECT CURRENT TRACK CIRCUIT TEST RECORD

RAIL, BALLAST RESISTANCE AND OTHER DATA

LOCATION________ SECTION Nº________ DIVISION________ CIRCUIT Nº________

Type of Circuit Neutral ☐ Relayed ☐ Polarized ☐ End fed ☐ Center fed ☐ L'gth.-No. of rails________=(________ft.)

RAIL	ANGLE BARS	INSUL. JOINTS	TRACK TIES	BALLAST	BATTERY	BONDS	TIE PLATES		RELAYS					
Weight	Type	Type	Kind	Kind	Type	Type	Type			East or North Relay	West or South Relay		East or North Relay	West or South Relay
Length	Condition	Number	Treatment	% Free of rails	Length of leads	Size (gauge)	Method of Fastening		Make			Rated Resist.		
Anchors per rail		Condition	Condition	% Drainage	Gauge of leads	Length (ins.)	To Tie	To Rail	Type			No. of Contacts		
Highway Crossings No. of____	Railroad Crossings No. of____	Stations No. of____			Housing	No. per Joint			Length of Leads			Rated Working		
Water Spouts No. of____	Coal Stations No. of____	Switches No. of____				Condition			Gauge of Leads			Rated Drop-away		

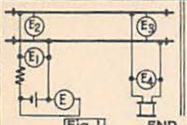


Fig. 1
Without Ammeter

END FED CIRCUIT

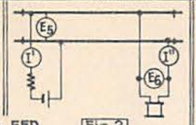


Fig. 2
With Ammeter in Circuit

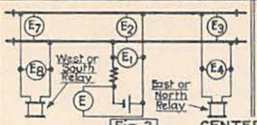


Fig. 3
Without Ammeter

CENTER FED CIRCUIT

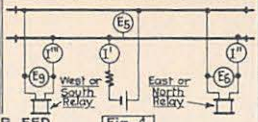


Fig. 4
With Ammeter in Circuit

TEST DATA Date of Test________19___

No. and arrangement of cells. M = Multiple S = Series					
Date set up.					
Inserted resistance at battery, rated ohms.					
Moisture condition of ballast.					
Temperature of air (deg. F.)	FIG. NO.				
E Volts at battery.	1-3				
E_1 Volts at track side of resistance unit.	1-3				
E_2 Volts at rails, at battery.	1-3				
E_3 Volts at rails, relay end.	1-3				
E_4 Volts at relay terminals.	1-3				
E_5 Volts at rails, at battery.	2-4				
E_6 Volts at relay terminals.	2-4				
I' Current at battery.	2-4				
I'' Current at relay.	2-4				
Maximum shunt resistance across rails to drop relay. Relay end.					
At battery.					
*Relay end.					
Relay working, amperes actual.					
Relay drop-away, amperes actual.					
*E_7 Volts at rails, relay end.	3				
*E_8 Volts at relay terminals.	3				
*E_9 Volts at relay terminals.	4				
*I''' Current at relay.	4				
*Relay working, amperes actual.					
*Relay drop-away, amperes actual					

COMPUTED DATA (Computed for Ammeter Resistance)

I Current to track.	$I'\frac{E_2}{E_5}$			
I_1 Current to relay.	$I''\frac{E_4}{E_6}$			
R_U Resistance of resistance unit.	$\frac{E-E_1}{I}$			
R_B Resistance of battery rail connections.	$\frac{E_1-E_2}{I}$			
R_R Resistance of relay rail connections.	$\frac{E_3-E_4}{I}$			
R_r Rail resistance total.	$\frac{2(E_2-E_3)}{I+I_1}$			
r_r Rail resistance per M ft. of track (2000 ft. of rail).	$\frac{R_r}{L}$			
R_b Ballast resistance total.	$\frac{E_2+E_3}{2(I-I_1)}$			
r_b Ballast resistance per M ft. of track.	R_bL			
*I_2 Current in relay.	$I'''\frac{E_8}{E_9}$			
*R_{R_1} Resistance of relay rail connections.	$\frac{E_7-E_8}{I_2}$			
*R_r Rail resistance total.	$\frac{4(2E_2-E_3-E_7)}{I+I_1+I_2}$			
*r_r Rail resistance per M ft. of track. (2000 ft. of rail.)	$\frac{R_r}{L}$			
*R_b Ballast resistance total.	$\frac{2E_2+E_3+E_7}{4(I-I_1-I_2)}$			
*r_b Ballast resistance per M ft. of track.	R_bL			

COMPUTED BY________, ________19___

INSTRUCTIONS FOR MAKING TESTS: *Additional tests and computations for center fed circuits.

1. Meters should be accurate.— 2. Battery voltage should be constant during period tests are being made.— 3. The track circuit should not be shunted or opened during period tests are being made. If shunted by train or otherwise, or opened, the tests should be repeated and these values recorded.— 4. The voltage readings should be taken one at a time.
5. When taking ampere reading I' the meter at relay end should not be in circuit.— 6. When taking ampere readings I" or I"' the meter at battery should not be in circuit.— 7. A variable resistance should be used across rails to obtain shunt value at which relay drops away. The total resistance of shunt wire and varible unit should be recorded.— 8. To obtain accurate results, the track circuit should be free from foreign current, including leakage of current from adjacent circuits.

(Signed)________ ________
TITLE

FORM SC-58

16# White Sulphite Bond - 8 X 10½
(Pads of 100 glued at top)
(A.A.R. SIG. SEC. 7021)

NYCS
SC-59

EXHIBIT "C"
SHEET___OF___SHEETS
DATED________19___
EFFECTIVE________19___

________________ RAILROAD

SIGNAL AND INTERLOCKING UNIT DISTRIBUTION

FOR________________

FUNCTION	UNIT NOS.	VALUE OF UNITS	____R.R.				____R.R.				____R.R.				____R.R.			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
TOTALS																		
TOTALS COLUMNS 1																		
TOTALS COLUMNS 2																		
TOTALS COLUMNS 3		.																
TOTALS COLUMNS 4																		

REFERENCE
EXHIBIT "A"
PLAN NO.________
DATED______19___
REV. NO.________
DATE______19___

EXHIBIT "B"
A.A.R. SIGNAL SECTION TABLE OF SIGNAL AND INTERLOCKING UNITS
DATE______19___

AGREEMENTS
(DATES)

PROPORTIONS		CONSTRUCTION					
		MAINTENANCE					
		OPERATION					
		OPERATING (OPERATORS SALARY SUPPLIES ETC.)					
INSERT COL. NUMBERS TO CORRESPOND WITH COLS. 1-2-3 AND 4	OWNERSHIP	SIG. STA.					
		MACHINE					
		INTERLOCKING					

APPROVED________19___ APPROVED________19___
TITLE______ R. R.______ TITLE______ R. R.______
APPROVED________19___ APPROVED________19___
TITLE______ R. R.______ TITLE______ R. R.______

NOTES:

FORM SC-59

White manifold 8 x 12½
(Pads of 100 glued at top)

---

0 1 2 3
Scale and all dimensions given in inches

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

058B

4-2-1935
4-28-1949

FORMS

D.C. TRACK CIRCUIT TEST REC. SC-58
SIG. & INTERL'K'G UNIT DISTRIB'N SC-59

Approved by Representatives of Lines Shown.
J. [illegible]
Chairman

Printed in U.S.A.

1 PURPOSE

These specifications cover rubber insulating tape suitable for insulating joints in electrical wires and cables and for other insulating purposes.

MANUFACTURE

2 COMPOUND

Tape shall consist of an unvulcanized or partially vulcanized rubber insulating compound. Compound shall be well, evenly and smoothly calendered, cut to specified widths and tightly wound in rolls with a separator between layers. Preferably the tape shall be dark grey in color.

3 SEPARATOR

Separator shall be parchment paper or glazed sheeting which shall be interposed between adjacent layers and cover the outside of the tape. Outside end of the roll shall be securely fastened. Upon unwinding the original roll the separator shall show no undue tendency to stick to the rubber or to ravel.

4 COMPOSITION

Rubber compound shall contain not less than 30 per cent of the best quality crude Hevea rubber, nor more than ½ of 1 per cent of free sulphur to which may be added small percentages of antioxidant, waxy hydrocarbons and carbon black. The remainder shall consist of suitable inorganic mineral fillers. Compound shall contain no organic matter other than that above specified. The percentages shall be based on the weight of the original compound.

PHYSICAL PROPERTIES

5 TENSILE STRENGTH

(a) Ultimate tensile strength of the tape shall be not less than 250 lb. per sq. in.

(b) Elongation of a 2 in. gage length determined when the tensile strength test is being made shall be not less than 300 per cent. (2 to 8 inches).

6 DIELECTRIC STRENGTH

Dielectric strength of the tape shall be not less than 350 volts per mil of thickness.

7 FUSION AND TACKINESS

Tape shall meet the fusion and tackiness tests hereinafter specified.

8 DIMENSIONS

Tape shall have the following nominal dimensions:

Width In.	Thickness In.	Length Ft.
¾	0.030	30
¾	0.030	15
2	0.030	15

Unless otherwise specified on the order ¾ in. tape shall be supplied in rolls having a nominal length of 30 feet.

9 PERMISSIBLE VARIATIONS

Thickness shall not vary from the nominal thickness more than plus or minus 0.003 in. and the width more than plus or minus 1/32 in. Length of the tape per roll shall be not less than the nominal length nor more than 5 per cent in excess of it. Rejection shall be based on the average of not less than 3 samples.

10 CHEMICAL ANALYSIS

Chemical analysis of the rubber compound shall be made according to the short procedure of the Standard Methods of Chemical Analysis of Rubber Products (A. S. T. M. Designation D297) of the American Society for Testing Materials.

11 ROOM TEMPERATURE

The temperature of the room in which the tensile strength, elongation, fusion and tackiness tests shall be made shall be between 68 deg. F. and 82 deg. F.

12 SPECIMENS

(a) At least 2 feet of tape from each roll shall be removed and discarded before taking test specimens.

(b) In placing the parallel gage marks on the test specimen care shall be taken not to cut the stock.

13 SAMPLING

Tape offered for inspection shall be divided into one or more lots of approximately equal numbers of rolls in accordance with the following table:

Rolls Offered for Inspection	No. of Lots
Up to 250	1
251 to 750	2
751 to 1500	3
1501 to 3000	4
3001 to 5000	5
Over 5000	5, plus 1 for each additional 1000 rolls.

The lots shall be marked for identification and one sample roll shall be taken at random for test purposes from each lot and marked to correspond with the lot from which it was selected. Each sample roll shall be tested according to these specifications.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

—SPECIFICATIONS—

RUBBER INSULATING TAPE

FOR RAILROAD SERVICE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R

85

ISSUE	DATE
1	8-20-193

Approved by Representatives of Lines Shown.

Chairman

(CONT'D ON PAGE 2)

14 TENSILE STRENGTH AND ELONGATION TESTS

Tests for tensile strength and elongation shall be performed in accordance with the Standard Methods of Physical Testing Rubber Products (A. S. T. M. Designation D15) of the American Society for Testing Materials, with the following exceptions:

(a) Room temperature shall be as specified in Section 11.

(b) Three specimens, free from visable defects, from each sample roll shall be tested. The average of three tests shall be reported.

(c) Test specimens shall be dumbbell shaped and cut with the A. S. T. M. standard die giving a ½ in. by 2 in. specimen except the wide ends of the specimen cut from ¾ in. tape need not be full width.

Test specimens shall be cut from a laminated sample, 2-ply thick, carefully rolled together to avoid entrapped air. The thickness of the composite specimen shall be used in calculating the tensile strength.

15 DIELECTRIC STRENGTH TEST

Dielectric strength shall be determined by placing a specimen between two flat electrodes ¼ in. wide by 4 in. long having square edges and rounded ends. Under an electrode pressure of 1 pound per square inch a 60-cycle alternating voltage of practically sine wave form shall be applied at a value less than 1000 volts and raised at the rate of 1000 volts per second until puncture occurs. In order to prevent flash over, increased width may be secured by attaching to each side of the test specimen an added piece of tape, making a ⅛ in. lap seam carefully rolled down.

16 FUSION TEST

Sample shall be tested on a mandrel ¼ in. in diameter which shall be held level in ball bearings of the Fafnir Bearing Co. Catalog No. 36, Serial No. 30, extra small or equivalent bearings. The mandrel shall turn freely under a weight of ¼ oz., suspended from a cotton thread wound in a single layer on the center of the mandrel. (See Figure 1 A. S. T. M. Designation D69 for suggested form of tape tester.)

Sample 7 in. long shall be taken from the roll, care being taken not to touch the surface to be tested with the hands or otherwise and 2 in. of the sample wound on the mandrel, and then a weight of 4 pounds per inch of width of the tape shall be attached.

Should this weight not be sufficient to elongate the tape 200 per cent additional downward force shall be applied by the hand until the desired elongation has been produced.

Tape shall then be wound on the mandrel at a uniform rate of 12 in. per minute and then be allowed to stand for 3 minutes with the weight attached. It shall then be allowed to unwind slowly until the fused turns are reached. The mandrel shall revolve not more than 2½ turns before the fused turns are reached. The tape shall sustain the weight for 2 minutes without further unwinding or break at the point of unwinding.

17 TACKINESS TEST

A specimen shall be taken and wound on the mandrel in the same manner as described in Section 16, and the weight immediately removed. The tape shall show no tendency to unwind from the mandrel.

18 MEASUREMENT OF THICKNESS

Thickness shall be measured with a micrometer graduated to 0.001 in. having circular shoes 0.24 in. to 0.26 in. in diameter and with a weight on the specimen of 9 oz. plus or minus 0.1 oz.

PACKING AND MARKING

19 PACKING

Each roll shall be enclosed in a suitable box.

20 MARKING

Each box shall be marked with the name of the manufacturer or trade-mark and the nominal width and length of the tape. The roll or box shall show the month and year of manufacture.

INSPECTION AND REJECTION

21 INSPECTION

(a) The Purchaser shall have the right to inspect the materials and processes of manufacture.

(b) Unless otherwise specified on the order the Contractor shall submit samples of tape taken from the lot to be shipped for test according to these specifications. Shipment shall not be made before the samples have been tested and the lot released.

(c) Where orders are marked "Inspection at Destination" shipments shall not be held for inspection. Samples of tape shall be selected and tested upon receipt of shipment which shall meet these specifications. If they do not the shipment shall be returned and the Contractor shall replace it at his own expense and pay all freight charges.

22 STORAGE GUARANTEE

Provided the tape has been properly stored, the manufacturer shall guarantee to replace without charge any tape which at any time within eight months after shipment will not meet the Fusion Test specified in Section 16 or to which the separator becomes unduly attached.

The tape shall be stored in the original packages and preferably in a cool dark location. It shall not be stored in close proximity to steam pipes, radiators or other sources of heat.

23 RETESTS AND REJECTIONS

(a) If the tape fails in any one test of those prescribed in these specifications, 2 additional rolls shall be taken and submitted to that test. If either of these 2 additional rolls fail the lot represented by the test specimens shall be rejected.

(b) The manufacturer shall replace the rejected tape and shall pay freight charges for return of such material.

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**

—SPECIFICATIONS—
RUBBER
INSULATING TAPE
FOR RAILROAD SERVICE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.Ry.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

85

ISSUE	DATE
1	8-20-1938

Approved by Representatives of Lines shown.
J C Mock
Chairman

(CONT'D ON PAGE......)

1 PURPOSE

(a) To provide ordering data and requirements for purchase and use of electric lamps in signals.

2 ORDERING REFERENCES

(a) Requisitions for lamps must be worded as follows:
.... lamps in accordance with N. Y. C. L., S. & T. C. C. Specifications 88, Item No........................

Volts................ Amperes / Watts / C. P. } ....Bulb........................

NOTE: Specify type of filament, "V" or "Rounded" when requirement differs from that shown in Specifications.

3 APPLICATION

(a) These specifications shall apply only to Tungsten filament lamps listed on page 3.

(b) These specifications shall apply only to lamps having clear bulbs.

4 DEFINITIONS AND STANDARDS

(a) The values of the electrical units in these specifications are the international units which have been in force since January 1, 1911.

(b) Unit of luminous intensity shall be the international candle as maintained by the Bureau of Standards at Washington, D. C.

(c) Photometric measure: The basis of photometric measure shall be total flux expressed in lumens or the equivalent (mean) spherical candle power. The (mean) spherical candle power of a lamp is the average candle power of the lamp in all directions in space and is equal to the total luminous flux of the lamp divided by 12.57.

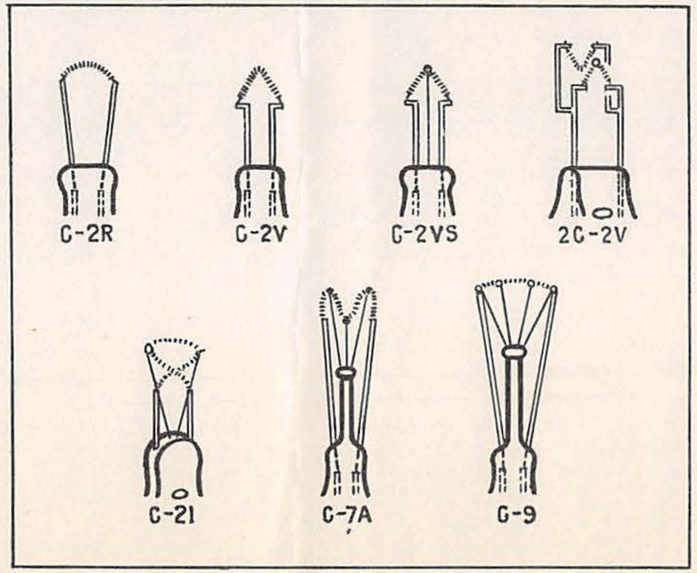
5 MECHANICAL CONSTRUCTION

(a) Lamps shall be well made and free from defects and imperfections which would prevent their meeting satisfactorily the lighting service conditions. Lamps shall conform to bulk sizes and shapes, filament construction, basing tolerances, bases and pins as shown on page 3.

(b) Bulbs shall be uniform in size and shape, clear and free from flaws or blemishes.

(c) Bases shall be firmly and accurately fitted to bulbs with suitable cement. The cement shall not soften or bulb become loose at temperatures incurred during lamp use or when installing in socket. The base shall be of good quality brass and must conform to the American Standards Association standards.

(d) The following are conventional diagrams of the various filament forms specified on page 3.



(e) Leading-in wires shall be securely attached to the end of the filament and shall be securely attached, without excess of solder, to terminals of the base which make contact with the socket.

(f) The Volts and Amperes, Watts or Candle Power shown on page 3, and manufacturer's name or trade-mark shall be placed on each lamp in such a manner that it will be legible throughout the life of the lamp.

6 PHYSICAL INSPECTION

(a) May be made either at factory or upon receipt of shipment by the Railroad.

(b) Test Quantity: The test quantity shall consist of not less than 5 per cent of each lot of lamps inspected and in no case less than 10 lamps (20 lamps for S-8 and G-6 automotive type).

(c) Rejection for Mechanical and Physical Defects: A lot of S-8 automotive type bulb lamps shall be deemed to comply with these specifications if the total number of test lamps rejected for physical defects incompatible with good workmanship and good service is not more than 20 per cent of the test lamps inspected. For lamps shown in the G-6 bulb, the allowable percentage is 30 per cent of the test lamps inspected. All other lots of Tungsten filament lamps covered by these specifications may be rejected without further test if 10 per cent plus 1 lamp (20 per cent plus 1 lamp when tested elsewhere than at the factory) or more of the inspection test lamps have physical defects incompatible with good workmanship and good service.

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

—SPECIFICATIONS—
SIGNAL
ELECTRIC LAMPS

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

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Approved by Representatives of Lines shown.
J C Mock
Chairman

(CONT'D ON PAGE 2)

7 INITIAL RATING TESTS

(a) All tests shall be made in a competent and expert engineering manner at the expense of the purchaser, excepting that when initial tests and inspections are made at the factory the manufacturer will be required to supply the necessary equipment, assistance, current and facilities for making such initial tests and inspections. The manufacturer shall have the privilege of witnessing and verifying all tests of his lamps made hereunder, and shall also have the privilege of obtaining copies of the results of the tests of his lamps and of having access to the records of such tests at all reasonable times. The method of test procedure may be modified in any particular, provided that it is mutually agreed that such modified procedure will yield results equivalent to those obtained with the procedure specified herein. Lamps shall not be submitted for inspection on the same day that they are manufactured.

(b) The number of initial rating test lamps selected for rating shall be 5 per cent of the lot (Minimum 10 lamps) for all lamps subject to inspection, except S-8 or G-6 bulb, automotive type lamps shown herein. The test quantity for S-8 or G-6 automotive type bulb lamps shown herein shall be not less than 5 per cent of each lot of lamps inspected and in no case less than 20 lamps.

(c) Rating test lamps are to be operated at design voltages (after proper seasoning). A lot of lamps subject to inspection other than S-8 or G-6 automotive type bulb lamps listed herein may be rejected if 20 per cent plus 2 lamps, (30 per cent plus 2 lamps when tested elsewhere than at the factory) or more of the rating test lamps depart from the manufacturer's declared rating by more than the initial rating tolerances shown on page 3. In the case of S-8 or G-6 automotive type bulb lamps, the particular lot may be rejected if the number of rating test lamps which depart from the manufacturer's declared rating by more than the tolerances shown on page 3 exceeds 25 per cent plus 2 lamps of the test quantity. (40 per cent plus 2 lamps, when tested elsewhere than at the factory). Individual rating test lamps may be rejected and eliminated from an acceptable lot if they fall outside these limits by more than 5 per cent.

(d) Before presenting lamps for inspection the manufacturer shall notify and obtain from the Signal Engineer of the railroad, approval of any changes or deviations from these specifications and the initial rating test data shown on Page 3. Copy of proposed changes or deviations must also be forwarded to the Chairman of the N.Y.C.L.S. & T.C. Committee.

(e) "Factory" and "Manufacturer" as used in above, indicates either the factory of the manufacturer or the factory or location of the party selling direct to the Railroad.

8 LIFE PERFORMANCE TEST

(a) Lamps for the life-performance test shall be selected from the rating-test lamps at a ratio of 1 to each 100 lamps in rating-test lot, and in no event, less than 5 lamps (10 lamps for S-8 or G-6 automotive type) shall be selected. The life-test lamps selected shall be representative of the rating-test lamps but no lamp shall be selected which does not fall within tolerances shown on Page 3.

(b) Life-test lamps shall be operated on test racks at design voltage indicated on Page 3.

(c) Lamps shall be tested in position lamp is used when in service.

(d) Accurate recording meter records shall be obtained throughout the test to show variation in voltage. Variation shall not exceed 1/4 of 1 per cent above or below test voltage.

(e) Lamps broken in handling or when current is not on them shall not be counted to reduce average lamp life.

(f) Any lot of lamps, provided such lot is represented by at least 5 lamps (10 lamps for S-8 or G-6 automotive type) may be rejected if the average hours' life of the test lamps when computed to the manufacturer's declared initial lumens per watt (or watts per spherical candle power) falls below the life values shown in the following Tables I and II.

TABLE I

No. of Lamps Averaged	Allowable Per Cent Variation from Rated Life	No. of Lamps Averaged	Allowable Per Cent Variation from Rated Life
99-55	7	13-12	16
54-45	8	11	17
44-35	9	10	18
34-30	10	9	19
29-25	11	8	20
24-20	12	7	21
19-18	13	6	23
17–16	14	5	25
15-14	15		

TABLE II

S-8 and G-6 bulb lamps automotive type

No. of Lamps Averaged	Allowable Per Cent Variation from Rated Life
100 and above	15
99-40	16
39-20	17
19-10	18

(g) Any lot of lamps may be rejected if average lumens at one-half life fall below the manufacturer's declared value by more than 8 per cent for S-8 or G-6 bulb lamps automotive type or 4 per cent in the case of other Tungsten filament lamps shown herein and subject to inspection. In addition if lamps burning in actual service conditions indicate a life less than that specified on page 3 the matter will be called to the attention of the manufacturer and if further investigation indicates a short life, adjustment will be made by manufacturer.

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

—SPECIFICATIONS—
SIGNAL
ELECTRIC LAMPS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
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JC Mock
Chairman

(CONT'D ON PAGE 3)

ORDERING REFERENCE							SPECIFICATIONS AND INITIAL RATING TEST DATA																		
Item No.	Volts	Amps.	Watts	Candle power	Bulb	Base	Filament	Light center length	Precision	Pins	Design volts	Rated life	Design lumens per watt	TOLERANCES % Plus or Minus		LIMITS				SEASONING AND TEST DATA					Item No.
														L.P.W.	Watts	L.P.W. or W.P.S.C.		Watts or S.C.P.		%Volts	Mins.	Standard lamp			
1	3.5	.3			S-11P	SC	C-2R	1¼	1/16	⊕	3.3	1000	7.7												1
2	6.		10.		S-11P	SC	C-2V	1¼	1/32	⊕	6.	1000	10.9												2
3	6.	.12 –.16			T-2	SLIDE	C-2 (R OR V)				6.		4.2												3
4	6.-8.			15.	S-8	SC	C-2R	1⅛		⊖	6.75	150	x .77	x 8	$\overset{x}{x}$ 10	x .69	.81	$\overset{x}{x}$ 13.5	16.5	100	45	15CP	6-8V	S-8	4
5	6.-8.			21.	S-8	SC	C-2V	1¼	'A'	⊕	6.50	125	x .74	x 7	$\overset{x}{x}$ 9	x .69	.79	$\overset{x}{x}$ 19.1	22.9	100	45	21CP	6-8V	S-8	5
6	6.-8.			3.	G-6	CAN.	C-2R	15/16			6.85	200	x 1.23	x 8	$\overset{x}{x}$ 10	x 1.12	1.32	$\overset{x}{x}$ 2.7	3.3	100	45	3CP	6-8V	G-6	6
7	8.		18.		PS-16	3 PS	C-2R	2 3/16	1/64		8.	1500	12.0	12	7	10.56	13.44	16.74	19.26	120	60	15W	32V	A-17	7
8	10.	.25			S-11P	SC	C-2R	1¼	1/16	⊕	10.	1000	9.7												8
9	10.		5.		S-11P	SC	C-2R	1¼	1/32	⊕	10.	1000	10.4	12	7	9.15	11.65	4.65	5.35	115	60	3CP	6-8V	G-6	9
10	10.		18.-3.5		PS-16	2 PS	2C-2V	2 7/32	1/64		10.	1500	10.6												10
11	10.		10.		S-11P	SC	C-2V	1¼	1/32	⊕	10.	1000	12.3	10	7	11.1	13.5	9.3	10.7	115	60	9W	12V	G-16½	11
12	10.		18.		PS-16	3 PS	C-2R	2 3/16	1/64		10.	1500	12.2	12	7	10.74	13.66	16.74	19.26	120	60	15W	32V	A-17	12
13	10.		18.		PS-16	2 PS	C-2V	2 7/32	1/64		10.	1500	11.5	10	7	10.35	12.65	16.74	19.26	120	60	15W	32V	A-17	13
14	10.		18.		S-11P	SC	C-2V	1¼	1/32	⊕	10.	1000	13.5	10	7	12.15	14.85	16.74	19.26	115	60	15W	32V	A-17	14
15	10.		40.		PS-16	3 PS	C-2V	2 3/16	1/64		10.	1500	13.7	10	7	12.33	15.07	37.2	42.8	120	60	25W	32V	A-19	15
16	12.	.12			S-11P	SC	C-2VS	1¼	1/16	⊕	12.	1000	8.												16
17	12.	.3			S-11P	SC	C-2VS	1¼	1/32	⊕	12.	1000	x 2.4	10	12	2.16	2.64	3.17	4.03	100	45				17
18	12.		5.		G-16½	MED.	C-2R	1¾			12.	1000	9.6												18
19	12.		9.		G-16½	2 PS	C-2R	1.91	1/64		12.	1500	10.8	12	7	9.5	12.1	8.45	9.74	120	60	9W	12V	G-16½	19
20	12.-16.			21.	S-8	SC	C-2R	1¼	'A'	⊕	12.8	200	x .73	x 10	$\overset{x}{x}$ 12	.67	.82	$\overset{x}{x}$ 18.5	23.6	105	45	21CP	6-8V	S-8	20
21	12.-16.			21.	S-8	DC	C-2R	1¼	'A'	⊕	12.6	300	x .75	x 10	$\overset{x}{x}$ 12	.67	.82	$\overset{x}{x}$ 18.5	23.6	105	45	21CP	6-8V	S-8	21
22	12.	.17			T-2	SLIDE	C-21				12.		6.8												22
23	12.-16.			3.	G-6	SC	C-2R	¾		⊕	13.	500	x 1.24	x 12	$\overset{x}{x}$ 15	1.07	1.36	2.55	3.45	115	30				23
24	12.-16.			3.	G-6	DC	C-2R	¾		⊕	13.	500	x 1.24	x 12	$\overset{x}{x}$ 15	1.07	1.36	2.55	3.45	115	30				24
25	12.-16.			3.	G-6	MS	C-2R	⅞			13.	500	x 1.24	x 12	$\overset{x}{x}$ 15	1.07	1.36	2.55	3.45	115	30				25
26	14.		5.		S-14	MED.																			26
27	20.	.060-.085			T-2	SLIDE	C-21				20.														27
28	60.		5.		S-14	MED.	C-9	2½			60.	1500	7.9												28
29	60.		20.		S-14		CARBON				60.														29
30	64.		6.		S-6	SC	C-7A	1 1/16			64.	1500	7.5												30
31	75.			2.	S-8	MS	CARBON				75.														31
32																									32

EXPLANATIONS:

P—as in S-11P = Plain bulb.
2 PS = 2 Pin rebasing sleeve—U.S.& S.Co. Type.
3 PS = 3 Pin rebasing sleeve—G.R.S.Co. Type.
SC = Single contact bayonet candelabra base.
DC = Double contact bayonet candelabra base.
CAN. = Candelabra screw base.
MS = Miniature screw base.
MED. = Medium screw base.
SLIDE = Telephone switchboard type base.

R = Rounded filament.
V = Inverted (V) filament.
S—as in C-2VS = Supported filament.
A—under precision = Axial alignment 0.03 in. and light center length 0.04 in.
⊖ = Plane of base pins parallel to plane of filament.
⊕ = Plane of base pins at 90 deg. angle to plane of filament.
X = Watts per spherical candle power.
$\overset{x}{x}$} = Spherical candle power.
R.P.11 Bulbs may be substituted for S-11 when specified.

NOTE: Values shown in column headed "Precision" indicate maximum permissible variation of filament from correct location.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

—SPECIFICATIONS—
SIGNAL
ELECTRIC LAMPS

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

88	
ISSUE	DATE
1	2-27-1935

Approved by Representatives of Lines shown.
J.C. Mock
Chairman

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PAGE 3

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GENERAL

1 Signal Forces must observe that signals display their proper indications.

2 High Signals shall be aligned, where practicable, so indications can be plainly seen by the engineman of an approaching train from a point 1,000 feet from and continuously to the signal, and, if it does not interfere with this requirement, so indications can be seen continuously from next signal in rear. Conditions that may effect the reading of a signal indication must be promptly reported to Supervisor.

3 Dwarf Signals shall be aligned, where practicable, so indications can be plainly seen by the engineman of an approaching train from a point 400 feet from and continuously to the signal.

4 Signals must be painted periodically and adjusting bolts lubricated to prevent rusting.

5 Bolts, nuts, dowel pins, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

6 Lenses, roundels, reflectors, glasses and lamps must be kept clean. Lamps must not be removed except for replacement.

7 Broken or cracked lenses of signals of the Color Light Type must be replaced as soon as practicable. If broken lens cannot be immediately replaced and is of the most restrictive indication color, signal lamp or lamps must be extinguished and lamp of required color arranged to display the most restrictive indication.

8 Where Spreadlight lenses are used they must be mounted and maintained so the beam spread is in the proper direction. When necessary to replace lenses, such replacements must be of the same kind.

9 Doors or covers must be kept tightly closed to prevent water, dust and snow from entering.

10 Wire openings must be sealed to prevent entrance of rodents, insects, etc.

11 Gaskets must be kept in good condition.

12 When necessary to replace a lamp, one of the same type, voltage and wattage must be used. Lamp replacements must be in accordance with Schedule, N. Y. C. Lines, Signal and Train Control Committee Plan 45.

13 Socket Surfaces must be clean and bright. Lamp must be pressed into socket far enough to be turned clockwise to end of slot so that contact spring may force lamp into proper place.

14 Lamp Receptacles may be changed or reset only where proper provisions have been made for refocusing.

15 Door or cover of lamp unit must be kept closed when trains are closely approaching.

SEARCHLIGHT TYPE

16 Mechanisms must be maintained in accordance with N.Y.C.L., S. & T.C.C. Instructions 25.

17 Emergency Mechanisms must be kept ready for immediate use.

18 Mechanisms must not be opened in the field. Defective mechanisms must be replaced promptly.

19 Field Energy must not exceed the values shown in the Table (pg. 8) N.Y.C.L., S.& T.C.C. Instructions 25 for D. C. Relays and Indicators by more than 25 per cent.

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN
CONTROL COMMITTEE

INSTRUCTIONS
COLOR LIGHT SIGNALS

N.Y.C.R.R.(E)
N.Y.C.R.R.(W)
N.Y.C.R.R.(OCL)
M. C.R.R.
C.C.C.& St L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL. R.R.

49

ISSUE	DATE
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Approved by Representatives of Lines Shown
J. C. Mock
Chairman

DEPT. 41
MAY
2
1932

INTERSTATE COMMERCE COMMISSION

EX PARTE NO. 171

RULES, STANDARDS, AND INSTRUCTIONS FOR INSTALLATION, INSPECTION, MAINTENANCE, AND REPAIR

OF

AUTOMATIC BLOCK SIGNAL SYSTEMS, INTERLOCKING,
TRAFFIC CONTROL SYSTEMS, AUTOMATIC TRAIN STOP,
TRAIN CONTROL, AND CAB SIGNAL SYSTEMS,
AND OTHER SIMILAR APPLIANCES, METHODS, AND SYSTEMS

Submitted June 13, 1950. Decided June 29, 1950

New rules, standards, and instructions prescribed to supersede those prescribed by the Commission's order of April 13, 1939

F. J. Melia, Starr Thomas, Eldon Martin, C. W. Krohl, M. L. Bluhm, Carson L. Taylor, Wm. L. Hunter, Joseph H. Wright, Wm. J. O'Brien, Jr., and *H. V. Rhedin* for railroad witnesses.

Harold C. Heiss, Russell B. Day, Charles W. Phillips, and *Martin H. Miller* for railroad employee organizations.

REPORT OF THE COMMISSION

DIVISION 3, COMMISSIONERS PATTERSON, JOHNSON, AND CROSS

PATTERSON, *Commissioner:*

On January 6, 1950, we issued a notice of proposed rule making, stating therein that investigation would be made pursuant to the provisions of section 25 of the Interstate Commerce Act for the purpose of revising, amending, and modifying the Rules, Standards, and Instructions for Installation, Inspection, Maintenance, and Repair of Automatic Block Signal Systems, Interlocking, Traffic Control Systems, Automatic Train Stop, Train Control, and Cab Signal Systems, and other Similar Appliances, Methods, and Systems, prescribed by the Commission's order of April 13, 1939. Such investigation was deemed necessary because the present rules, standards, and instructions had been in effect for more than 10 years and experience had shown that some of them should be eliminated and others clarified, and that in some respects they were incomplete and inadequate to carry out the purposes of section 25.

Notice of the proposed rule making was given to the general public by depositing a copy of the notice of January 6, 1950, in the office of the Secretary of the Commission for public inspection, by filing a copy of the notice with the Director, Division of the Federal Register, and by serving a copy on each common carrier subject to the Interstate Commerce Act, and on each national organization of railroad employees. Each such notice was accompanied by a copy of rules, standards, and instructions tentatively proposed as a substitute for those prescribed by the Commission's order of April 13, 1939, and by a copy of Special Rules of Practice applicable to this proceeding. The Special Rules of Practice, so far as pertinent here, provided that all evidence should be submitted in written form, with affidavit attached, on or before certain specified dates, and that cross-examination of witnesses would be granted upon written request to the Commission and the witnesses on or before a specified date.

The only evidence offered in opposition to the tentatively proposed rules, standards, and instructions was submitted by the officers of 6 railroads, and they offered objections to but 10 of the 162 rules. Cross-examination of these officers was seasonably requested on behalf of the Brotherhood of Locomotive Firemen and Enginemen, Order of Railway Conductors of America, American Train Dispatchers Association, Order of Railroad Telegraphers, and Brotherhood of Railroad Signalmen of America, and such cross-examination has been had. Evidence in support of the proposed rules was also submitted on behalf of these organizations. We will consider each of the rules objected to separately.

RULE 10

This rule reads as follows: "Electric locks on new installations and new electric locks applied to existing installations shall be of the forced-drop type." The only railroad objecting to it is the Chicago, Burlington and Quincy, hereinafter referred to as the Burlington. Its objection is that electric locks of the forced-drop type should not be required on hand-operated switches for the reason that it knows of no manufacturer making electric locks of the forced-drop type for such switches. When advised that at least one manufacturer makes a lock for hand-operated switches that will meet the requirements of this rule, its objection was withdrawn.

RULE 14

The only railroad objecting to this rule is the Great Northern, and it objects only to paragraphs (*a*) and (*c*).

It requests that the rule be rewritten to permit a method of signal protection at spring switches now used on that railroad and submitted a proposed revision which would permit the continued use of its present method of protection.

The purpose of this rule is to prevent a train moving out of a siding, or from a reverse main track at the end of double track, in front of another train closely approaching in a trailing direction. The rule recognizes that a train should be permitted to proceed from a siding and follow a preceding train into a block but only under conditions that are considered safe. The system in use on the Great Northern provides essentially the same protection as rule 14 so far as maintrack trailing movements at a spring switch are concerned, but does not provide as great a degree of safety as rule 14 in the following respects:

A train on the main track is much more likely to receive a signal requiring a stop without first having passed a signal indicating that a stop will be required at the next signal under the system in use on the Great Northern than under a system designed to meet the requirements of rule 14.

The special instructions under which the Great Northern's system is operated provide in part as follows:

> A switch indicator consisting of a single yellow light unit (normally dark) and a switch-key-controller mounted on an iron mast located at clearance point of a siding, must be operated by a member of the crew who, together with engineer, must observe and be governed by its indication before fouling main track or making movement from siding to main track through a spring switch in automatic block signal territory, unless movement is made immediately after an opposing train has passed the switch and automatic signal at leaving end of siding indicates "Proceed."

Under these instructions, an indication (a normally dark indicator) requires a stop under some conditions and permits a train to pass it without a stop under other conditions.

The revision of the rule submitted by the Great Northern makes no provision for following moves. As pointed out above, it is safer that such moves be made only under the conditions set forth in the rule.

The Great Northern's suggested revision of the rule would not provide as great a degree of safety as is desirable. A system installed in compliance with the rule can be made just as flexible, so far as train operation is concerned, as the system in use on the Great Northern, and, so far as future installations are concerned, any additional expense necessary to meet the requirements of the rule will not be unduly burdensome.

As to existing installations, it is recognized that there may be some where the protection provided so closely approaches that required under rule 14 that relief from a requirement that they be brought into exact compliance with the rule may be warranted. The rule has, therefore, been modified to the extent of adding a note to the rule with respect to existing installations.

RULE 23

The Great Northern is the only railroad objecting to this rule. It takes exception to that part of the rule which reads: "A single white light shall not be used" and to that part prescribing fundamental indications which reads:

> A yellow light, a lunar light, or a series of lights or a semaphore blade in the upper or lower quadrant at an angle of approximately 45 degrees to the vertical, shall be used to indicate that speed is to be restricted and stop may be required.

A single white light has been used for years by the Great Northern as an indication that a dragging equipment detector has been actuated and requires that a stop be made as promptly as the

(CONT'D ON PAGE 2)

safety of the train will permit and the train examined for dragging equipment. A lunar light also has been used by it as an indication on a spring switch indicator to designate "a spring switch with facing-point lock in proper operating condition."

The reasons for barring the use of a single white light to give an indication are that a broken colored signal lens will permit a white light instead of a colored light to be displayed, and to avoid confusion that might result from other white lights along the right of way.

The lunar light was included in the paragraph describing the lights and positions of lights or semaphore arms that should be used to indicate "that speed is to be restricted and stop may be required" because there are carriers that use that light for such an indication. If the rule were revised to eliminate the words "a lunar light" as requested by the Great Northern, the use made of the lunar light on these other carriers would be restricted.

For these reasons it is not desirable to revise the rule. However, from the standpoint of safety, there appears to be no objection to the use that the Great Northern is making of the single white light or of the lunar light. There may be other carriers that make similar use of these lights. Each such case should be considered on its own merits. The note to the rule will be made to apply to the entire rule by eliminating the words "with respect to fundamental indications as applied to semaphore signals."

RULE 24

The Great Northern objects to this rule in the belief that it prohibits the use of successive restrictive signals, which are permitted under present rule 205. Rule 24 clearly permits the use of successive restrictive signals and no change therein is warranted or necessary.

RULE 203

The only objection to this rule is by the Atchison, Topeka and Santa Fe system lines, hereinafter collectively referred to as the Santa Fe. Their sole objection is that the rule is not made subject to footnote 5, which provides that existing installations be brought into conformity with certain other rules within a period of 5 years. At the cross-examination of their witness they modified their request for time within which to comply with this rule to a period of 3 years. They equipped 134 crossovers with special track circuits or electric locks and have 328 to be still equipped to comply with the rule. They are carrying out an extensive program of signal installation, including the installation of automatic train stop on 2,930 miles of track in compliance with our order in *Appliances and Systems to Promote Safety of Operation*, 268 I. C. C. 547, which will tax their signal construction forces for over 2 years. Considering the number of crossovers to be equipped and the present program of signal installation, the Santa Fe will be given until December 31, 1952, the date on or before which compliance with our order in the case cited is required, to comply with the requirements of rule 203. No change in the rule is necessary.

RULE 303

The only objection to this rule is by the Great Northern. Its objection is that the rule does not clearly show whether it applies to power interlocking in which dynamic or battery indicated circuits must deliver indications which control the mechanical interlocking between switch and signal levers, and that it should be clarified. The rule clearly states that the circuits shall be selected through circuit controller operated directly by switch points or by switch locking mechanism or through relay controlled by such circuit controller for each facing-point switch, movable-point frog, or derail in the route governed, and needs no clarification. The combination of indications and mechanical locking referred to by the witness does not comply with this rule.

RULE 308

The Burlington is the sole objector to this rule. It requests that that portion reading "provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking plant are not permitted" be eliminated, or modified to read "where simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking plant are permitted, opposing signals shall be overlapped," contending that the rule would prohibit the use of a siding leading out of certain interlocking plants when they are unattended. The basic requirement of this rule is that mechanical or electric locking or electric circuits shall be installed to prevent signals from displaying aspects which permit conflicting movements. An exception is made in the last sentence reading: "Manual interlocking in service as of the date of this order at which opposing signals on the same track are permitted simultaneously to display aspects to proceed when interlocking is unattended, may be continued, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted."

This sentence is intended to apply to interlockings where opposing signals on the same track are permitted to display aspects authorizing conflicting movements when the interlocking is unattended. If the signals are overlapped as suggested by the Burlington, aspects authorizing conflicting movements cannot be displayed and the basic requirement of the rule is met.

In order to clarify the rule the last sentence is changed to read "Manual interlocking in service as of the date of this order at which opposing signals on the same track are permitted simultaneously to display aspects authorizing conflicting movements when interlocking is unattended, may be continued, provided that simultaneous movements in opposite directions on the same track between stations on either side of the interlocking are not permitted." This modification does not change the intent of the rule.

RULE 311

The Great Northern contends that this rule does not clearly indicate whether automatic interlocking signal control circuits may be selected through relays which repeat track relays, or must be selected through track relays directly, and requests that the rule be clarified to permit use of repeater relays.

We recognize that it is necessary in some instances to select control circuits through repeater relays and it was not intended that this rule be interpreted to prohibit this practice. The rule has been revised to read as follows:

The control circuits for aspects with indications more favorable than "proceed at restricted speed" shall be selected through track relays for all track circuits in the route governed or through repeating relays for such track relays. At automatic interlocking, signal control circuit shall be selected (1) through track relays for all track circuits in the route governed and in all conflicting routes within interlocking limits or through repeating relays for such track relays; (2) through signal mechanism contacts or relay contacts closed when signals for such conflicting routes display stop aspects; and (3) through normal contacts of time releases for such conflicting routes or contacts of relays repeating the normal position of contacts of such time releases."

RULE 313

The Burlington requests that the first sentence of this rule be clarified. It reads as follows:

> Steel or wrought-iron pipe one inch or larger, or members of equal strength shall be used for operating connections for each switch, derail, movable-point frog, facing-point lock, rail-locking device of movable bridge protected by interlocking, and mechanically operated signal, except up-and-down rod which may be three-fourths inch pipe or solid rod.

In some instances two switches, or a combination of one switch and one derail, or two facing-point locks are in combination and operated from one pipe, and the Burlington is apprehensive that the word "each" in the first sentence might be interpreted to prohibit such combinations.

The rule as worded was not intended to prohibit such combinations from being operated from one pipeline, and to clarify this point the sentence has been reworded as follows:

Steel or wrought-iron pipe 1 inch or larger, or members of equal strength shall be used for operating connections for switches, derails, movable-point frogs, facing-point locks, rail-locking devices of movable bridge protected by interlocking, and mechanically operated signals, except up-and-down rod which may be three-fourths inch pipe or solid rod.

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RULE 566

Objections to this rule were filed by the Union Pacific, Santa Fe, Burlington, and Chicago, Milwaukee, St. Paul and Pacific, hereinafter referred to as the Milwaukee. The rule requires that all locomotives operated in automatic train-stop, train-control, or cab-signal territory be equipped with apparatus responsive to the roadway equipment and that such apparatus be in operative condition. The Commission has heretofore granted relief from this requirement where locomotives operated in train-stop, train-control, or cab-signal territory short distances, and the note to which the rule is subject contemplates that in the future relief from the requirements of the rule will be warranted in some instances. In the fourth and seventh reports on further hearing in *Appliances and Systems to Promote Safety of Operation,* 274 I. C. C. 628, and 276 I. C. C. 798, the requirement for installation of automatic train-stop, train-control, or cab-signal devices on freight locomotives was postponed until the further order of the Commission in the case of the Santa Fe and the Union Pacific, respectively. The Burlington and the Milwaukee have pending in that proceeding petitions for similar relief. The objections to this rule will be met by adding the following to the note to the rule:

Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of these rules.

RULE 567

Objections to this rule were filed by the Union Pacific, Santa Fe, Burlington, Milwaukee, and Illinois Central. Their objections relate only to the last sentence of the rule which reads as follows:

> Where an absolute block is established in advance of and for the train on which the device is inoperative and an automatic block signal system is not in use, train may proceed at medium speed and where an automatic block signal system is in operation, train may proceed on signal indications but not to exceed 80 miles per hour.

In the rules an absolute block is defined as a block in which no train is permitted to enter while it is occupied by another train, and medium speed is defined as a speed not exceeding 40 miles per hour.

One of the objections to this rule is based on the thought that the rule requires that the absolute block referred to be a manual block. Clearly, the rule does not so provide. An absolute block can be established by the use of automatic signals, as well as by manual block operators. For example, if the aspects of automatic signals that ordinarily indicate "stop and proceed" are made to indicate "stop" for a train on which the train-stop, train-control, or cab-signal devices have failed or been cut out en route, and the train required to stop until an aspect indicating that it might proceed is shown, an absolute block in advance of that train within the meaning of this rule would thereby be established. When the rule was thus explained at the hearing for cross-examination, the greater part of the objections to it were satisfied.

Another objection was to the words "and for," it being thought that their use meant that an absolute block had to be established in the rear as well as in advance of the train. This was not the intent of the rule, but as it is possible to so interpret it, these words will be eliminated.

The only other objections to the rule is the differentiation in speeds at which a train may proceed after an absolute block has been established dependent upon whether or not an automatic block system is in use. This objection is raised by the Santa Fe and the Illinois Central. The former has in operation a train-control system on its double-track line between Pequot, Ill., and Fort Madison, Iowa, 175.4 miles, and the latter has in operation an automatic train-stop system on its double-track line between Champaign, Ill., and Branch Junction, Ill., 122 miles, and on its single-track line between Waterloo, Iowa, and Fort Dodge, Iowa, 97 miles. There are no automatic wayside block signals on any of these lines, and when the train-control or train-stop devices fail or are cut out en route an absolute manual block in advance of the train is established and the train then permitted to proceed at the maximum authorized speed. They desire to continue this practice, but have no objection to limiting the speed to a maximum of 79 miles per hour. It is their contention that when an absolute block is established the maximum permitted speed should be the same, whether the absolute block is a manual block or an automatic block. There is merit in this contention as the protection afforded by an absolute block would be substantially the same whether the absolute block is a manual block or an automatic block.

At the hearing for cross-examination it developed that all of the objections to this rule would be removed if the last sentence quoted above were changed to read:

Where an absolute block is established in advance of the train on which the device is inoperative, train may proceed at not to exceed 79 miles per hour.

Such change will be made in the rule.

The proposed rules, standards and instructions, with the changes herein indicated above are approved.

An appropriate order will be entered.

APPENDIX

Ex Parte No. 171

RULES, STANDARDS, AND INSTRUCTIONS FOR INSTALLATION, INSPECTION, MAINTENANCE, AND REPAIR OF AUTOMATIC BLOCK SIGNAL SYSTEMS, INTERLOCKING, TRAFFIC CONTROL SYSTEMS, AUTOMATIC TRAIN STOP, TRAIN CONTROL, AND CAB SIGNAL SYSTEMS, AND OTHER SIMILAR APPLIANCES, METHODS, AND SYSTEMS.

At a Session of the INTERSTATE COMMERCE COMMISSION, Division 3, held at its office in Washington, D. C., on the 29th day of June, A. D. 1950.

It appearing, That on January 6, 1950, the division issued in the above-entitled proceeding a notice of proposed rule making (49 F. R. 131) pursuant to the provisions of section 25 of the Interstate Commerce Act (49 CFR 26) accompanied by a copy of Special Rules of Practice applicable thereto, and by a copy of Rules, Standards, and Instructions for Installation, Inspection, Maintenance, and Repair of Automatic Block Signal Systems, Interlocking, Traffic Control Systems, Automatic Train Stop, Train Control, and Cab Signal Systems, and other Similar Appliances, Methods, and Systems, which were proposed to supersede the rules, standards, and instructions prescribed by the Commission's order of April 13, 1939;

It further appearing, That all evidence filed pursuant to said Special Rules of Practice has been fully considered and that cross-examination of witnesses as provided by said special rules has also been had; and

It further appearing, That the division has, on the date hereof, made and filed its report in this proceeding containing its findings of fact and conclusions thereon, which said report is hereby referred to and made a part hereof:

It is ordered, That —

Sec.	
136.0	Applicability of this part.

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Authority: § § 136.0 to 136.839 issued under sec. 12, 24 Stat. L 383, as amended; 49 U.S.C. 12. Interpret or apply sec. 441, 41 Stat. L. 498, as amended; 49 U.S.C. 26.

§ 136.0 *Applicability of this part.* — The following rules, standards, and instructions are hereby approved and prescribed for observance by each common carrier subject to the provisions of section 25 of the Interstate Commerce Act, on and after October 1, 1950.

SUBPART A. RULES AND INSTRUCTIONS. ALL SYSTEMS

General

§ 136.1 *Plans, where kept.*—Track layout plan, circuit plan, and where mechanical locking is used, locking sheet and dog chart, shall be kept at each interlocking and circuit plan shall be kept at each controlled point in traffic-control systems; circuit plan for each automatic signal shall be available at the headquarters of the employee directly responsible for the maintenance of such signal; copies of all of the foregoing plans, and profile plan, drawn to scale, showing locations of signals, grades and alinement, for the sections of railroad under the jurisdiction of a divisional signal supervisory officer shall be kept at his headquarters; copies of plans pertaining to signal and interlocking facilities under the jurisdiction of general, regional, or system signal officers shall be kept at their offices. All plans shall be correct and legible and available for use by the Commission's representatives.

§ 136.2 *Grounds.*—Each circuit, the functioning of which affects safety of train operation, shall be kept free of any ground or combination of grounds which will permit a flow of current equal to or in excess of 75 percent of the release value of any relay or other electromagnetic device in the circuit, except circuit which includes any track rail.

§ 136.3 *Locking of instrument cases and interlocking machine cabinets.*—Outdoor signal and instrument cases shall be locked, except signal mechanism housings at interlockings where maintenance forces are continuously on duty. Power interlocking machine cabinets, time releases, and electric locks exposed on interlocking machines shall be locked or sealed.

§ 136.4 *Interference with normal functioning of device.*—The normal functioning of any device shall not be interfered with in testing or otherwise without first taking measures for insuring safety of train operation which depends on normal functioning of such device.

§ 136.5 *Design of control circuits on closed circuit principle.*—All control circuits the functioning of which affects safety of train operation shall be designed on the closed circuit principle, except circuits for roadway equipment of intermittent automatic train-stop system.

§ 136.6 *Hand-operated switch equipped with switch circuit controller.*—Hand-operated switch equipped with switch circuit controller connected to the point, or with facing-point lock and circuit controller, shall be so maintained that when point is open one-fourth inch or more on facing-point switch and three-eighths inch or more on trailing-point switch, track or control circuits will be opened or shunted or both, and, if equipped with facing-point lock with circuit controller, switch cannot be locked. Switch circuit controllers, facing-point locks and switch-and-lock movements and their connections shall be securely fastened in place, and contacts maintained with an opening of not less than one-sixteenth inch when open.

§ 136.7 *Circuit controller operated by switch-and-lock movement.*—Circuit controller operated by switch-and-lock movement shall be maintained so that normally open contacts will remain closed and normally closed contacts will remain open until the switch is locked.

§ 136.8 *Operating characteristics of electromagnetic apparatus.*—Operating characteristics of electromagnetic apparatus shall be maintained in accordance with the limits within which such apparatus is designed to operate.

§ 136.9 *Selection of circuits through indicating or annunciating instruments.*—Signal control and electric locking circuits shall not be selected through the contacts of instruments designed primarily for indicating or annunciating purposes in which an indicating element attached to the armature is arranged so that it can in itself cause improper operation of the armature.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952.

§ 136.10 *Electric locks, forced-drop type, where required.*—Electric locks on new installations and new electric locks applied to existing installations shall be of the forced-drop type.

§ 136.11 *Adjustment, repair, or replacement of apparatus.*—Any piece of apparatus or any part thereof which fails to perform its intended function shall be promptly adjusted, repaired, or replaced.

§ 136.12 *Spring switch signal protection, where required.*—Signal protection shall be provided for facing and trailing movements through spring switch within interlocking limits, and through spring switch hereafter installed in automatic block-signal, train-stop, train-control, or cab-signal territory where train movements over the switch are made at a speed exceeding 20 miles per hour, except that signal protection shall be required only with the current of traffic on track signaled for movement in only one direction.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier.

§ 136.13 *Spring switch, selection of signal control circuits through circuit controller.*—The control circuits of signals governing facing movements over a main-track spring switch shall be selected through the contacts of a switch circuit controller, or through the contacts of relay repeating the position of such circuit controller, which, when normally closed switch point is open one-fourth inch or more, will cause such signals to display their most restrictive aspects, except that where a separate aspect is displayed for facing movements over the switch in the reverse position the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

§ 136.14 *Spring switch signal protection, requirements.*—(*a*) The indication of signal governing movements from siding to main track with the current of traffic on track signaled for movements in only one direction through a spring switch in automatic block-signal territory shall be not less restrictive than "proceed at restricted speed" when the block, into which movements are governed by the signal, is occupied, and shall be "stop" when the main track is occupied by a train approaching the switch within at least 1,500 feet in approach of the approach signal located stopping distance from the main-track signal governing trailing movements over switch, except that the indication may be caused to be less restrictive if approach or time locking is used.

(*b*) The indication of signal governing movements against the current of traffic from the reverse main of main tracks to a single track, or signal governing movements from a siding to a main track signaled for movements in either direction, through a spring switch, in automatic block-signal territory, shall be not less restrictive than "proceed at restricted speed" when the block, into which movements are governed by the signal, is occupied by a preceding train, and shall be "stop" when the block on the single track into which the signal governs is occupied by an opposing train.

(*c*) The indication of signal governing movements against the current of traffic from the reverse main of main tracks to a single track or signal governing movements from a siding to a main track signaled for movements in either direction through a spring switch in automatic block-signal territory shall be "stop" when the normal direction main track of the double track or the single track signaled for movements in both directions is occupied by a train approaching the switch within at least 1,500 feet in approach of the approach signal located stopping distance from the main-track signal governing trailing movements over switch, except that indication may be caused to be less restrictive if approach or time locking is used.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952. As to existing installations, relief from the requirements of this section will be granted upon an adequate showing by an individual carrier.

§ 136.15 *Timetable instructions.*—Automatic block, traffic-control, train-stop, train-control, and cab-signal territory shall be designated in timetable instructions.

Roadway signals and cab signals

§ 136.21 *Location of roadway signals.*—Each roadway signal hereafter installed shall be located over or to the right of the track it governs.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

§ 136.22 *Semaphore signal arm, clearance to other objects.*—At least one-half inch clearance shall be provided between semaphore signal arm, and any object that may interfere with its operation.

§ 136.23 *Aspects and indications.*—Aspects shall be shown by the position of semaphore blades, color of lights, position of lights, flashing of lights, or any combination thereof. They may be qualified by marker plate, number plate, letter plate, marker light, shape and color of semaphore blades or any combination thereof, subject to the following conditions:

Night aspects of roadway signals, except qualifying appurtenances, shall be shown by lights; day aspects by lights or semaphore arms. A single white light shall not be used.

Reflector lenses or buttons or other devices which depend for visibility upon reflected light from an external source shall not be used in night aspects, except qualifying appurtenances.

The aspects of cab signals shall be shown by lights or by illuminated letters.

Each aspect displayed by a signal shall be identified by a name and shall indicate action to be taken. Only one name and indication shall apply to those aspects indicating the same action to be taken; the same aspect shall not be used with any other name and indication.

The fundamental indications of signal aspects shall conform to the following:

A red light, a series of horizontal lights, or a semaphore blade in a horizontal position shall be used to indicate stop.

A yellow light, a lunar light, or a series of lights or a semaphore blade in the upper or lower quadrant at an angle of approximately 45° to the vertical, shall be used to indicate that speed is to be restricted and stop may be required.

A green light, a series of vertical lights, or a semaphore blade in a vertical position in the upper quadrant or 60° or 90° in the lower quadrant shall be used to indicate proceed at authorized speed.

The names, indications, and aspects of roadway signals and cab signals shall be defined in block-signal and interlocking rules in effect on each railroad subject to these rules, standards, and instructions. Copy of such block-signal and interlocking rules shall be filed with the Interstate Commerce Commission within 6 months after the date of this order and copy of subsequent modifications shall be filed with said Commission within 30 days after such modifications become effective. Such rules and any modifications thereof shall remain in effect until otherwise ordered by the Commission.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier.

§ 136.24 *Spacing of roadway signals.*—Each roadway signal shall be located with respect to the next signal or signals in advance which govern train movements in the same direction so that the indication of a signal displaying a restrictive aspect can be

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complied with by means of a brake application, other than an emergency application, initiated at such signal, either by stopping at the signal where a stop is required, or by a reduction in speed to the rate prescribed by the next signal in advance where reduced speed is required.

§ 136.25 *False restrictive position of semaphore signal arm or failure of lamp in light signal.*—If an arm of a semaphore signal assumes a false restrictive position or if a lamp in a light signal fails the signal shall not display a less restrictive aspect than intended.

NOTE.—Existing installations on each railroad, which do not conform to the requirements of this section shall be brought into conformity therewith in accordance with the following schedule:

Not less than 20 percent on or before October 1, 1951.
Not less than 40 percent on or before October 1, 1952.
Not less than 60 percent on or before October 1, 1953.
Not less than 80 percent on or before October 1, 1954.
The remainder on or before October 1, 1955.

§ 136.26 *Buffing device, maintenance.*—Buffing device shall be maintained so as not to cause the signal to display a less restrictive aspect than intended.

§ 136.27 *Phantom signal aspect.*—Measures shall be taken to prevent recurrence of a phantom signal aspect.

Track circuits

§ 136.51 *Track circuit requirements.*—Track relay shall be in deenergized positions whenever any of the following conditions exists, and the track circuit of an automatic train-stop, train-control, or cab-signal system shall be deenergized in the rear of the point where any of the following conditions exists:

(*a*) When a rail is broken or a rail or switchfrog is removed except when a rail is broken or removed in the shunt fouling circuit of a turnout or crossover, provided, however, that shunt fouling circuit may not be used in a turnout through which permissible speed is greater than 45 miles per hour. It shall not be a violation of this requirement if a track circuit is energized when a break occurs within the limits of the joint bars or rail-joint bond, or as a result of leakage current or foreign current in the rear of a point where a break occurs or a rail is removed.

(*b*) When a train, locomotive, or car occupies any part of a track circuit, including fouling section of turnout, except turnouts of a hand-operated maintrack crossover. It shall not be a violation of this requirement where the presence of sand, rust, dirt, grease, or other foreign matter on the rail prevents effective shunting.

(*c*) Where switch shunting circuit is used:

1. Switch point is not closed in normal position.
2. A switch is not locked where facing-point lock with circuit controller is used.
3. An independently operated fouling-point derail equipped with switch circuit controller is not in derailing position.

§ 136.52 *Relayed cut-section.*—Where relayed cut-section is used in territory where noncoded direct-current track circuits are in use, the energy circuit to the adjoining track circuit shall be open and the track circuit shunted when the track relay at such cut-section is in deenergized position.

§ 136.53 *Track circuit feed at grade crossing.*—At grade crossing with an electric railroad where foreign current is present, the electric energy for noncoded direct-current track circuit shall feed away from the crossing.

§ 136.54 *Minimum length of track circuit.*—The length of any track circuit, except trap circuit or special circuit not used for control of signaling facilities, shall be greater than maximum inner wheel base of any locomotive or car.

§ 136.55 *Dead section, maximum length.*—Where dead section exceeds 35 feet, special circuit shall be installed. Where shortest outer wheel base of a locomotive operating over such dead section is less than 35 feet, the maximum length of the dead section shall not exceed the length of the outer wheel base of such locomotive unless special circuit is used.

§ 136.56 *Shunting sensitivity.*—Track circuit shall be so maintained that track relay will be in deenergized position if, when track circuit is dry, a shunt of 0.06 ohm resistance is connected across the track rails of the circuit, including fouling sections of turnouts.

§ 136.57 *Shunt wires.*—Shunt wires and fouling wires, except shunt wires to switch circuit controller through which signal control circuits are controlled and track circuits are shunted, shall consist of at least two conductors and each shall be of sufficient conductivity and maintained in such condition that the track relay will be in deenergized position when the circuit is shunted.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952.

§ 136.58 *Turnout, fouling section.*—Fouling section of turnout shall extend to clearance point.

§ 136.59 *Insulated rail joints.*—Insulated rail joints shall be maintained in condition to prevent sufficient track circuit current from flowing between the rails separated by the insulation to cause a failure of any track circuit involved.

Wires and cables

§ 136.71 *Signal wires on pole lines.*—Signal wires carried on pole lines shall be securely tied in on insulators.

§ 136.72 *Clearance of overhead signal wires and cables.*—Where men are permitted to be on top of cars the clear space between the lowest overhead signal line conductor and the top of track rails shall be not less than 27 feet at 60° F., no wind. The distance may be reduced to 25 feet for guys and for cables carried on messengers.

§ 136.73 *Open-wire transmission line, clearance to other circuits.*—Open-wire transmission line operating at voltage of 750 volts or more shall be placed not less than 4 feet above the nearest crossarm carrying signal or communication circuits.

§ 136.74 *Protection of insulated wire; splice in underground wire.*—Insulated wire shall be protected from mechanical injury. The insulation shall not be punctured for test purposes. Splice in underground wire shall have insulation resistance at least equal to the wire spliced.

§ 136.75 *Insulated wires and cables, supports.* — Insulated wires and cables used aerially shall be supported on insulators or by messengers.

§ 136.76 *Interference of wires with operating parts of mechanisms.*—Wires shall not interfere with operating parts of mechanisms.

§ 136.77 *Tagging of wires.*—Each wire shall be tagged or otherwise marked so it can be identified at each terminal. Nomenclature shall correspond to that of the circuit plan. Tags or other marks of identification in instrument cases and apparatus housings shall be made of insulating material and shall not interfere with moving parts of apparatus.

§ 136.78 *Lightning arrester.* — Lightning arrester shall be properly connected and ground maintained with resistance to ground preferably not more than 25 ohms.

Inspections and tests, all systems

§ 136.101 *Purpose of inspections and tests; removal from service of relay failing to meet test requirements.*—The following inspections and tests shall be made in accordance with specifications of the carrier subject to approval of the Commission to determine if the apparatus and/or equipment is maintained in condition to perform its intended function. Relay or other electromagnetic device which fails to meet the requirements of specified tests shall be removed from service and shall not be restored to service until its operating charcteristics are in accordance with the limits within which such relay or electromagnetic device is designed to operate.

§ 136.102 *Signal mechanism.*—Signal mechanism shall be inspected at least once every 6 months, and tests of the operating characteristics of all parts shall be made at least once every 2 years.

§ 136.103 *Switch circuit controller.*—Switch circuit controller shall be inspected and tested at least once every 3 months.

§ 136.104 *Shunt fouling circuit.*—Shunt fouling circuit shall be inspected and tested at least once every 3 months.

§ 136.105 *Electric lock.* — Electric lock, except forced-drop type, shall be tested at least once every 2 years.

§ 136.106 *Relays.*—Relay in service, except locomotive relay,

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shall be tested at least once every 2 years.

§ 136.107 *Lightning arresters.*—Gas and vacuum type lightning arresters shall be tested at least once a year.

§ 136.108 *Insulation resistance tests.*—Insulation resistance tests shall be made when wires, cables, and insulation are dry. Wires and cables, except wires connected directly to track rails, shall be tested in accordance with the following schedule. Conductors shall be promptly repaired or renewed when insulation resistance is below the following values:

Description	Period (years)	Minimum allowable resistance
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, any part of which is underground or in trunking.	5	1 megohm
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering not specifically designed for underground use, no part of which is underground or in trunking.	8	Do.
Low voltage (660 volts or less) wires and cables with insulation and protective outer covering designed specifically for underground use, or in underground conduit, or as submarine cables.	8	Do.
Local signal wiring	8	Do.
Lead covered signal power cable	8	100 megohms between sectionalizing switches.
Underground signal power lines not lead sheathed	5	40 megohms for voltages up to and including 660 volts for section tested 100 megohms between sectionalizing switches for voltages exceeding 660

§ 136.109 *Records of results of tests; forms for keeping records; where filed.*—Results of tests made in compliance with §§ 136.102 to 136.108, inclusive, 136.376 to 136.387, inclusive, and 136.576, 136.577, 136.586, 136.588, and 136.589 shall be recorded on forms provided by the railroad. Such forms shall show name of railroad, place and date, equipment tested, repairs, replacements, adjustments made, and condition in which apparatus was left. and signature of employee making the test. Each form shall be filed in the office of a divisional officer of the division on which the tests were made.

SUBPART B, AUTOMATIC BLOCK-SIGNAL SYSTEMS

Standards

§ 136.201 *Track-circuit control of signals.*—Signals shall be controlled automatically by track circuits extending through the entire block.

§ 136.202 *Signal governing movements over hand-operated switch.*—Signal governing movements over hand-operated switch in the facing direction shall display its most restrictive aspect when the normally closed point is open one-fourth inch or more and, in the trailing direction, three-eighths inch or more, except that where a separate aspect is displayed for facing movements over the switch in the normal and in the reverse position, the signal shall display its most restrictive aspect when the switch points are open one-fourth inch or more from either the normal or reverse position.

§ 136.203 *Hand-operated crossover between main tracks, protection.*—At hand-operated crossover between main tracks protection shall be provided by one of the following: (1) An arrangement of one or more track circuits and switch circuit controllers, (2) facing-point locks on both switches of the crossover with both locks operated by a single lever, or (3) electric locking of the switches of the crossover. Signals governing movements over either switch shall display their most restrictive aspect when any of the following conditions exists: (*a*) Where protection is provided by one or more track circuits and switch circuit controllers, and either switch is open or the crossover is occupied by a train, locomotive, or car in such a manner as to foul the main track; it shall not be a violation of this requirement where the presence of sand, rust, dirt, grease or other foreign matter on the rail prevents effective shunting; (*b*) where facing-point locks with a single lever are provided, and either switch is unlocked; and (*c*) where the switches are electrically locked, before the electric locking releases.

§ 136.204 *Track signaled for movements in both directions, requirements.*—On track signaled for movements in both directions, a train shall cause one or more opposing signals immediately ahead of it to display an aspect requiring a stop. On such track signals shall be so arranged and controlled that if opposing trains can simultaneously pass signals displaying proceed aspects, and the next signal in advance of each such signal then displays an aspect requiring a stop, the distance between opposing signals requiring a stop shall be not less than the aggregate of the stopping distances for movements in each direction. Where such opposing signals are spaced stopping distance apart for movements in one direction only, signals arranged to display restrictive aspects shall be provided in approach to at least one of the signals. Where such opposing signals are spaced less than stopping distance apart for movements in one direction, signals arranged to display restrictive aspects shall be provided in approach to both such signals.

NOTE.—Existing installations on each railroad, which do not conform to the requirements of this section shall be brought into conformity therewith in accordance with the following schedule:

Not less than 20 percent on or before October 1, 1951.
Not less than 40 percent on or before October 1, 1952.
Not less than 60 percent on or before October 1, 1953.
Not less than 80 percent on or before October 1, 1954.
The remainder on or before October 1, 1955.

§136.205 *Signal control circuits, requirements.*—The circuits shall be so installed that each signal governing train movements into a block will display its most restrictive aspect when any of the following conditions obtains within the block: (1) Occupancy by a train, locomotive, or car, (2) when points of a switch are not closed in proper position, (3) when an independently operated fouling point derail equipped with switch circuit controller is not in derailing position, and (4) when a track relay is in deenergized position; or when signal control circuit is deenergized.

§ 136.206 *Battery or power supply with respect to relay, location.*—The battery or power supply for each signal control relay circuit, where an open-wire circuit or a common return circuit is used, shall be located at the end of the circuit farthest from the relay.

§ 136.207 *Electric lock on hand-operated switch, control.*—Electric lock on hand-operated switch shall be controlled so that it cannot be unlocked until control circuits of signals protecting such switch have been opened. Approach or time locking shall be provided.

SUBPART C, INTERLOCKING

Standards

§ 136.301 *Where signals shall be provided.*—Signals shall be provided to govern the train movements into and through interlocking limits.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952. (See also note 1 following § 136.302.)

§ 136.302 *Track circuits and route locking.*—Track circuits and route locking shall be provided throughout interlocking limits. (See note 1, and with respect to route locking only, also note 2.)

NOTE 1.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

NOTE 2.—Existing installations on each railroad, which do not conform to the requirements of this section shall be brought into conformity therewith in accordance with the following schedule:

Not less than 20 percent on or before October 1, 1951.
Not less than 40 percent on or before October 1, 1952.
Not less than 60 percent on or before October 1, 1953.
Not less than 80 percent on or before October 1, 1954.
The remainder on or before October 1, 1955.

§ 136.303 *Control circuits for signals, selection through circuit controller operated by switch points or by switch locking mechanism.*—The control circuit for power-operated or slotted

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mechanical signal governing movements at higher than restricted speed in the facing direction over switches, movable-point frogs, and derails shall be selected through circuit controller operated directly by switch points or by switch locking mechanism, or through relay controlled by such circuit controller, for each facing-point switch, movable-point frog, and derail in the routes governed by such signal. Circuits shall be arranged so that such signal can display an aspect to proceed only when each such switch, movable-point frog, and derail in the route is in proper position. Such power-operated signals hereafter installed shall be controlled in this manner through circuit controllers or switch repeating relays for all switches, movable-point frogs, and derails in the routes governed by such signals.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952.

§ 136.304 *Mechanical locking or same protection effected by circuits.*—Mechanical locking, or the same protection effected by means of circuits, shall be provided.

§ 136.305 *Approach or time locking.*—Approach or time locking shall be provided in connection with signals governing movements at higher than restricted speed.

§ 136.306 *Facing-point lock or switch-and-lock movement.*—Facing-point lock or switch-and-lock movement shall be provided for mechanically operated switch, movable-point frog, or split-point derail.

§ 136.307 *Indication locking.*—Indication locking shall be provided for operative approach signals of the semaphore type, power-operated home signals, power-operated switches, movable-point frogs, and derails, and for all approach signals hereafter installed, except light signals all aspects of which are controlled by coded track circuits or by double-wire line circuits.

§ 136.308 *Mechanical or electric locking or electric circuits, requisites.*—Mechanical or electric locking or electric circuits shall be installed to prevent signals from displaying aspects which permit conflicting movements except that opposing signals may display an aspect indicating proceed at restricted speed at the same time on a track used for switching movements only, by one train at a time. Manual interlocking in service as of the date of this order at which opposing signals on the same track are permitted simultaneously to display aspects authorizing conflicting movements when interlocking is unattended, may be continued, provided that simultaneous train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier to allow opposing signals on the same track simultaneously to display aspects to proceed through an interlocking which is unattended, provided that train movements in opposite directions on the same track between stations on either side of the interlocking are not permitted at the same time.

§ 136.309 *Loss of shunt at automatic interlocking.*—At automatic interlocking, a loss of shunt for 5 seconds or less shall not permit an established route to be changed.

NOTE.—Existing installations shall be brought into conformity with the requirements of this section on or before October 1, 1952.

§ 136.310 *Signal governing approach to home signal.*—A signal shall be provided on main track to govern the approach with the current of traffic to any home signal except where the home signal is the first signal encountered when leaving yard or station and authorized speed approaching such signal is not higher than slow speed. When authorized speed between home signals on route governed is 20 miles per hour or less, an inoperative signal displaying an aspect indicating "approach next signal prepared to stop" may be used to govern the approach to the home signal.

§ 136.311 *Signal control circuits, selection through track relays and through signal mechanism contacts and time releases at automatic interlocking.*—The control circuits for aspects with indications more favorable than "proceed at restricted speed" shall be selected through track relays for all track circuits in the route governed or through repeating relays for such track relays. At automatic interlocking, signal control circuit shall be selected (1) through track relays for all track circuits in the route governed and in all conflicting routes within interlocking limits or through repeating relays for such track relays; (2) through signal mechanism contacts or relay contacts closed when signals for such conflicting routes display stop aspects; and (3) through normal contacts of time releases for such conflicting routes or contacts of relays repeating the normal position of contacts of such time releases.

§ 136.312 *Movable bridge, interlocking of signal appliances with bridge devices.*—When movable bridge is protected by interlocking the signal appliances shall be so interlocked with bridge devices that before a signal governing movements over the bridge can display an aspect to proceed the bridge and track must be alined and locked, with the bridge locking members within 1 inch of their proper positions and with the track rail on the movable span within three-eighths inch of correct surface and alinement with the rail on the bridge abutment or fixed span.

§ 136.313 *Pipe for operating connections, requirements.*—Steel or wrought-iron pipe 1 inch or larger, or members of equal strength shall be used for operating connections for switches, derails, movable-point frogs, facing-point locks, rail-locking devices of movable bridge protected by interlocking, and mechanically operated signals, except up-and-down rod which may be three-fourths inch pipe or solid rod. Pipes shall be fully screwed into coupling and both ends of each pipe shall be riveted to pipe plug with two rivets. Pipeline shall not be out of alinement sufficiently to interfere with the proper operation of the interlocking, shall be properly compensated for temperature changes, and supported on carriers spaced not more than 8 feet apart on tangent and curve of less than 2° and not more than 7 feet apart on curve of 2° or more. With lever in any position, couplings in pipeline shall not foul carriers. (With respect to requirements for double rivets, see note.)

NOTE.—Existing installations on each railroad, which do not conform to the requirements of this section shall be brought into conformity therewith in accordance with the following schedule:

Not less than 20 percent on or before October 1, 1951.
Not less than 40 percent on or before October 1, 1952.
Not less than 60 percent on or before October 1, 1953.
Not less than 80 percent on or before October 1, 1954.
The remainder on or before October 1, 1955.

§ 136.314 *Electric lock for hand-operated switch or derail.*—Electric lock shall be provided for each hand-operated switch or derail within interlocking limits, except where train movements are made not exceeding 20 miles per hour. At manually operated interlocking it shall be controlled by operator of the machine and shall be unlocked only after signals governing movements over such switch or derail display aspects indicating stop. Approach or time locking shall be provided.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

Rules and instructions

§ 136.326 *Mechanical locking removed or disarranged, requirement for permitting train movements through interlocking.*—When mechanical locking of interlocking machine is being changed or is removed from the machine, or locking becomes disarranged or broken, unless protection equivalent to mechanical locking is provided by electric locking or electric circuits, train movements through the interlocking shall not be permitted until each switch, movable-point frog, or derail in the route is spiked, clamped, or blocked in proper position so that it cannot be moved by its controlling lever, and then train movements shall not exceed restricted speed until the interlocking is restored to normal operation. It will not be necessary to comply with this requirement at interlockings where protection is in service in accordance with section 303, provided that the signal controls are arranged so that the signals cannot display an aspect the indication of which is less restrictive than "proceed at restricted speed."

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§ 136.327 *Switch, movable-point frog, or split-point derail.*—Switch, movable-point frog or split-point derail shall be maintained so that it cannot be locked if the switch point is prevented by an obstruction from closing to within three-eighths inch.

§ 136.328 *Plunger of facing-point lock.*—Plunger of facing-point lock shall have at least 8-inch stroke. When lever is in reverse position plunger shall pass through lock rod one-half inch or more.

§ 136.329 *Bolt lock.*—Bolt lock shall be so maintained that signal governing movements over switch or derail and displaying an aspect indicating stop cannot be operated to display a less restrictive aspect while derail is in derailing position, or when switch point is open one-half inch or more.

§ 136.330 *Locking dog of switch-and-lock movement.*—Locking dog of switch-and-lock movement shall extend through lock rod one-half inch or more in either normal or reverse position.

§ 136.331 *Repairs to switch and signal valves and cylinders.*—Repairs to switch and signal valves and cylinders shall not be made while they are in service.

§ 136.332 *Air distribution system, draining condensation.*—Provision shall be made for draining condensation out of air distribution system at low points. Condensers, tanks, reservoirs, and air distribution lines shall be drained frequently enough to avoid overflow of condensation into branch lines and apparatus.

§ 136.333 *Pole changer on electric switch operating mechanism.*—Pole changer on electric switch operating mechanism shall be maintained so that movement of switch mechanism follows movement of controlling lever.

§ 136.334 *Point detector.*—Point detector shall be maintained so that when switch mechanism is locked in normal or reverse position, contacts cannot be opened by manually applying force at the closed switch point. Point detector circuit controller shall be maintained so that the contacts will not assume the position corresponding to switch point closure if the switch point is prevented by an obstruction, from closing to within one-fourth inch where latch-out device is not used, and to within three-eighths inch where latch-out device is used.

§ 136.335 *Dogs, stops, and trunnions of mechanical locking.*—Driving pieces, dogs, stops, and trunnions shall be rigidly secured to locking bars. Swing dogs shall have full and free movement. Top plates shall be maintained securely in place.

§ 136.336 *Locking bed.*—The various parts of the locking bed, locking bed supports, and tappet stop rail shall be rigidly secured in place and alined to permit free operation of locking.

§ 136.337 *Locking faces of mechanical locking, fit.*—Locking faces shall fit squarely against each other with a minimum engagement when locked of at least one-half the designed locking face.

§ 136.338 *Mechanical locking required in accordance with locking sheet and dog chart.*—Mechanical locking shall be in accordance with locking sheet and dog chart currently in effect.

§ 136.339 *Mechanical locking, maintenance requirements.*—Locking and connections shall be maintained so that, when a lever or latch is mechanically locked, the following will be prevented:

(*a*) *Mechanical machine.*

(1) Latch-operated locking. Raising lever latch block so that bottom thereof is within three-eighths inch of top of quadrant.

(2) Lever-operated locking. Moving lever latch block more than three-eighths inch on top of quadrant.

(*b*) *Electromechanical machine.*

(1) Lever moving in horizontal plane. Moving lever more than three-sixteenths inch when in normal position or more than seven-sixteenths inch when in reverse position.

(2) Lever moving in arc. Moving lever more than 5°.

(*c*) *Power machine.*

(1) Latch-operated locking. Raising lever latch block so that bottom thereof is within seven thirty-seconds inch of top of quadrant.

(2) Lever moving in horizontal plane. Moving lever more than five-sixteenths inch when in normal position or more than nine-sixteenths inch when in reverse position.

(3) Lever moving in arc. Moving lever more than 5°.

§ 136.340 *Electromechanical interlocking machine, locking between electrical and mechanical levers.*—In electromechanical interlocking machine, locking between electric and mechanical levers shall be maintained so that mechanical lever cannot be operated except when released by electric lever.

§ 136.341 *Latch shoes, rocker links, and quadrants.*—Latch shoes, rocker links, and quadrants of Saxby and Farmer machines shall be maintained so that locking will not release if a downward force not exceeding a man's weight is exerted on the rocker while the lever is in the midstroke position.

§ 136.342 *Switch circuit controller.*—Switch circuit controller connected at the point to switch, derail, or movable-point frog, shall be maintained so that its contacts will not be in position corresponding to switch point closure when switch point is open one-fourth inch or more.

Inspections and tests

§ 136.376 *Mechanical locking.*—Mechanical locking in interlocking machine shall be tested when new locking is placed in service or change in locking is made. Complete test shall be made at least once every 4 years.

§ 136.377 *Approach locking.* — Approach locking shall be tested at least once a year.

§ 136.378 *Time locking.*—Time locking shall be tested at least once a year.

§ 136.379 *Route locking.*—Route or other type of switch locking shall be tested at least once every 3 months.

§ 136.380 *Indication locking.*—Indication locking for semaphore signals and for switch or lock levers shall be tested at least once a year, and for light signals at least once every 2 years.

§ 136.381 *Traffic locking.*—Traffic locking shall be tested at least once a year.

§ 136.382 *Switch obstruction test.*—Switch obstruction test shall be made at least once a month.

§ 136.383 *Valve locks and valve magnets.*—Valve locks on valves of the noncut-off type, valves, and valve magnets shall be tested at least once every 3 months.

§ 136.384 *Cross protection.*—Cross protection shall be tested at least once every 3 months.

§ 136.385 *Time releases and timing relays.*—Time releases and timing relays shall be tested at least once every 3 months. The timing shall be maintained at not less than 90 percent of the predetermined time interval, which shall be shown on the plans or marked on the time release or relay.

§ 136.386 *Restoring feature on power switches.*—Restoring feature on power switches shall be tested at least once every 3 months.

§ 136.387 *Movable bridge locking.*—Movable bridge locking shall be tested at least once a year.

SUBPART D, TRAFFIC CONTROL SYSTEMS

Standards

§ 136.401 *Automatic block-signal system and interlocking standards applicable to traffic-control systems.*—The standards prescribed in § § 136.201 to 136.203, inclusive, § § 136.205, 136.206, 136.303, 136.307, 136.310, and 136.311 shall apply to traffic-control systems.

§ 136.402 *Signal control, track circuit and control operator.*—Signals governing movement at higher than restricted speed shall be controlled by continuous track circuits. Also, in addition, at controlled point they shall be controlled by control operator, and, at manually operated interlocking, manually in cooperation with control operator.

§ 136.403 *Signals at controlled point.*—Signals at a controlled point shall be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting movements.

§ 136.404 *Signals at adjacent controlled points.*—Signals at adjacent controlled points shall be so interconnected that aspects to proceed cannot be displayed simultaneously for conflicting movements.

§ 136.405 *Track signaled for movement in both directions, change of direction of traffic.*—On track signaled for movements in both directions, occupancy of the track between opposing sig-

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nals at adjacent controlled points shall prevent changing the direction of traffic from that which obtained at the time the track became occupied.

§ 136.406 *Indication of track circuit occupancy at controlled points.*—Occupancy of track circuits at controlled points shall be automatically indicated at the control station.

§ 136.407 *Approach or time locking, where required.*—Approach or time locking shall be provided for all controlled signals and for all electric locks on hand-operated switches.

§ 136.408 *Route locking.*—Route locking shall be provided where switches are power operated.

§ 136.409 *Control machine, indication of switch operation.*—It shall be indicated on the control machine when power-operated switch has completed its movement and is locked.

§ 136.410 *Hand-operated switch electrically locked.* — Each hand-operated switch hereafter installed in main track where train movements are made at speeds exceeding 20 miles per hour shall be electrically locked in normal position. Electric lock may be unlocked either automatically or by the control operator, but only after control circuits of signals governing movements over the switch in each direction have been opened.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

Rules and instructions

§ 136.426 *Interlocking rules and instructions applicable to traffic-control systems.*—The rules and instructions prescribed in § § 136.327 and 136.328, 136.330 to 136.334, inclusive, and 136.342 shall apply to traffic-control systems.

Inspections and tests

§ 136.476 *Interlocking inspections and tests applicable to traffic-control systems.* — The inspections and tests prescribed in § 136.377 to 136.380, inclusive, and 136.382, 136.383, 136.385, and 136.386 shall apply to traffic-control systems.

SUBPART E. AUTOMATIC TRAIN-STOP, TRAIN-CONTROL, AND CAB-SIGNAL SYSTEMS

Standards

§ 136.501 *Forestalling device and speed control.*—

(*a*) An automatic train-stop system may include a device by means of which the automatic application of the brakes can be forestalled.

(*b*) Automatic train-control system shall include one or more of the following features:

(1) Low-speed restriction, requiring the train to proceed under slow speed after it has either been stopped by an automatic application of the brakes, or under control of the engineman, its speed has been reduced to slow speed, until the apparatus is automatically restored to normal because the condition which caused the restriction no longer affects the movement of the train.

(2) Medium-speed restriction, requiring the train to proceed under medium speed after passing a signal displaying an approach aspect or when approaching a signal requiring a stop, or a stop-indication point, in order to prevent an automatic application of the brakes.

(3) Maximum-speed restriction, effecting an automatic brake application whenever the predetermined maximum speed limit is exceeded.

NOTE.—Relief from the requirements of subparagraphs (1) and (2) of this paragraph will be granted, insofar as speed limits fixed by definitions of slow and medium speeds are concerned, upon an adequate showing by an individual carrier where automatic train-control systems now in service enforce speed restrictions higher than those required by definitions in § § 136.700 to 136.838 inclusive.

§ 136.502 *Automatic brake application, initiation by restrictive block conditions stopping distance in advance.*—An automatic train-stop or train-control system shall operate to initiate an automatic brake application at least stopping distance from the entrance to a block, wherein any condition described in § 136.205 obtains, and at each signal requiring a reduction in speed.

§ 136.503 *Automatic brake application, initiation when predetermined rate of speed exceeded.*—An automatic train-control system shall operate to initiate an automatic brake application when the speed of the train exceeds the predetermined rate as required by the setting of the speed control mechanism.

§ 136.504 *Operation interconnected with automatic block-signal system.*—An automatic train-stop or train-control system shall operate in connection with an automatic block-signal system and shall be so interconnected with the signal system as to perform its intended function in event of failure of the engineman to obey a signal requiring a reduction in speed.

§ 136.505 *Proper operative relation between parts along roadway and parts on locomotive.*—Proper operative relation between the parts along the roadway and the parts on the locomotive shall obtain under all conditions of speed, weather, wear, oscillation, and shock.

§ 136.506 *Release of brakes after automatic application.*—The automatic train-stop or train-control apparatus shall prevent release of the brakes after automatic application until a reset device has been operated, or the speed of the train has been reduced to a predetermined rate, or the condition that caused the brake application no longer affects the movement of the train. If reset device is used it shall be arranged so that the brakes cannot be released until the train has been stopped, or it shall be located so that it cannot be operated by engineman without leaving his accustomed position in the cab.

§ 136.507 *Brake application, full service.* — The automatic train-stop or train-control apparatus shall, when operated, cause a full service application of the brakes.

§ 136.508 *Interference with application of brakes by means of brake valve.*—The automatic train-stop, train-control, or cab-signal apparatus shall be arranged so as not to interfere with the application of the brakes by means of the brake valves and not to impair the efficiency of the air-brake system.

§ 136.509 *Two or more locomotives coupled.*—The automatic train-stop, train-control, or cab-signal apparatus shall be arranged so that when two or more locomotives are coupled, or a pushing or helping locomotive is used, it can be made operative only on the locomotive from which the brakes are controlled.

§ 136.510 *Conformance with established clearances.* — The automatic train-stop, train-control, and cab-signal apparatus shall be arranged so as to conform to carriers' established clearances for equipment and structures.

§ 136.511 *Cab signals controlled in accordance with block conditions stopping distance in advance.*—The automatic cab-signal system shall be arranged so that cab signals will be continuously controlled in accordance with conditions described in § 136.205 that obtain at least stopping distance in advance.

§ 136.512 *Cab-signal indication when locomotive enters block where restrictive conditions obtain.*—The automatic cab-signal system shall be arranged so that when a locomotive enters or is within a block, wherein any condition described in § 136.205 obtains, the cab signals shall indicate "proceed at restricted speed."

§ 136.513 *Audible indicator.*—The automatic cab-signal system shall be arranged so that when the cab signal changes to display a more restrictive aspect, an audible indicator will sound continuously until silenced by manual operation of an acknowledging device.

§ 136.514 *Interconnection of cab-signal system with roadway-signal system.*—The automatic cab-signal system shall be interconnected with the roadway-signal system so that the cab-signal indication will not authorize operation of the train at a speed higher than that authorized by the indication of the roadway signal that governed the movement of a train into a block except when conditions affecting movement of trains in the block change after the train passes the signal.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of

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this part.

§ 136.515 · *Visibility of cab signals.*—The cab signals shall be plainly visible to members of the locomotive crew from their stations in the cab.

§136.516 *Cab indicator, requirements.* — The cab indicator shall have a distinctive sound which will be clearly audible throughout the cab under all operating conditions.

Rules and instructions, roadway

§ 136.526 *Roadway element not functioning properly.*—When a roadway element except track circuit of automatic train-stop, train-control, or cab-signal system is not functioning as intended, the signal associated with such roadway element shall be caused manually to display its most restrictive aspect until such element has been restored to normal operative condition.

§ 136.527 *Roadway element insulation resistance.*—Insulation resistance between roadway inductor or magnet winding and ground shall be maintained at not less than 10,000 ohms.

§ 136.528 *Restrictive condition resulting from open hand-operated switch, requirement.*—When facing-point hand-operated switch is open one-fourth inch or more, or a trailing-point hand-operated switch three-eighths inch or more, or hand-operated switch is not locked where facing-point lock with circuit controller is used, the resultant restrictive condition of an automatic train-stop or train-control device of the continuous type or the resultant restrictive cab-signal indication of an automatic cab-signal device on an approaching locomotive shall be maintained to within 300 feet of the points of the switch.

§ 136.529 *Roadway element inductor, height and distance from rail.*—Inductor of the inert roadway element type shall be maintained with the inductor pole faces at a height above the plane of the tops of the rails, and with its inner edge at a horizontal distance from the gage side of the nearest running rail, in accordance with specifications of the carrier on file with the Commission.

§ 136.530 *Ramp, height and distance from rail.*—Ramp of automatic train-stop device shall be maintained with its contact surface at its highest point at a height above the plane of the tops of the rails, and with its center line at a horizontal distance from the gage side of the nearest running rail, in accordance with specifications of the carrier on file with the Commission.

§ 136.531 *Trip arm, height and distance from rail.*—Trip arm of automatic train-stop device when in stop position shall be maintained at a height above the plane of the tops of the rails, and at a horizontal distance from its center line to gage side of the running rail, in accordance with specifications of the carrier on file with the Commission.

§ 136.532 *Strap iron inductor, use restricted.*—No railroad shall use strap iron inductor, short ramp, or other roadway element with characteristics differing from its standard type, on track where speed higher than restricted speed is permitted.

§ 136.533 *Track magnet, height.*—Track magnet located between the rails of a track shall not extend above the plane of the tops of the rails.

§ 136.534 *Entrance to equipped territory, requirements.*—Where trains are not required to stop at the entrance to equipped territory, except when leaving yards and stations and speed until entering equipped territory does not exceed restricted speed, the automatic train-stop, train-control, or cab-signal device shall be operative at least stopping distance from the entrance to such territory except where the approach thereto is governed by automatic approach signal.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier.

Rules and instructions, locomotives

§ 136.551 *Power-supply voltage, requirement.* — The voltage of power supply shall be maintained within 10 percent of rated voltage.

§ 136.552 *Insulation resistance, requirement.*—Insulation resistance between wiring and ground shall be not less than the following:

Continuous inductive automatic train-stop, train-control, and cab-signal systems, 250,000 ohms.

Intermittent inductive automatic train-stop systems, 20,000 ohms.

§ 136.553. *Seal or lock, where required.*—Seal or lock shall be maintained on any device, other than the double-heading cock, by means of which operation of the pneumatic portion of the apparatus can be cut out.

§ 136.554 *Rate of pressure reduction, equalizing reservoir or brake pipe.*—The equalizing-reservoir pressure or brake-pipe pressure reduction during an automatic brake application shall be at a rate not less than that which results from a manual service application.

§ 136.555 *Repaired or rewound receiver coil.*—Receiver coil which has been repaired or rewound shall have the same operating characteristics which it possessed originally or as currently specified for new equipment.

§ 136.556 *Adjustment of relay.*—Change in adjustment of relay shall be made only in a shop equipped for that purpose except when receiver coils, electro-pneumatic valve, or other essential part of the equipment is replaced. Irregularities in power-supply voltage or other variable factors in the circuit shall not be compensated for by adjustment of the relay.

§ 136.557 *Receiver, intermittent inductive, location with respect to rail.*—Receiver of intermittent inductive automatic train-stop device of the inert roadway element type shall be maintained with bottom of the receiver at a height above the plane of the tops of the rails, and with its outer edge at a horiontzal distance from the gage side of the nearest rail, in accordance with specifications of the carrier on file with the Commission.

§ 136.558 *Contact shoe, location with respect to rail.*—Contact face of shoe of automatic train-stop and train-control device shall be maintained at a height above the plane of the tops of the rails, and with center line of shoe at a horizontal distance from the gage side of the nearest rail, in accordance with specifications of the carrier on file with the Commission.

§ 136.559 *Receiver, intermittent magnetic, location with respect to rail.*—Receiver of intermittent magnetic inductive automatic train-stop device shall be maintained with lower surface of receiver at a height above the plane of the tops of the rails, in accordance with specifications of the carrier on file with the Commission.

§ 136.560 *Contact element, mechanical trip type, location with respect to rail.*—Contact element of automatic train-stop device of the mechanical trip type shall be maintained at a height above the plane of the tops of the rails, and at a horizontal distance from the gage side of the rail, in accordance with specifications of the carrier on file with the Commission.

§136.561 *Safety chain or safety hanger.*—Safety chain or safety hanger provided for receiver of continuous inductive automatic train-stop, train-control, or cab-signal device shall clear receiver core 1 inch or more.

§ 136.562 *Minimum rail current required.* — The minimum rail current required to restore the locomotive equipment of continuous inductive automatic train-stop or train-control device to normal condition, or to obtain a proceed indication of automatic cab-signal device (pickup) shall be in accordance with specifications of the carrier on file with the Commission.

§ 136.563 *Delay time.*—Delay time of automatic train-stop or train-control system shall not exceed 8 seconds and the spacing of signals to meet the requirements of § 136.24 shall take into consideration the delay time.

§ 136.564 *Acknowledging time.*—Acknowledging time of intermittent automatic train-stop device shall be not more than 20 seconds.

§ 136.565 *Provision made for preventing operation of pneumatic brake-applying apparatus by double-heading cock, requirement.*—Where provision is made for preventing the operation of the pneumatic brake-applying apparatus of an automatic train-stop or train-control device when the double-heading cock is placed in double-heading position, the automatic train-stop or train-control device shall not be cut out before communication is closed between the engineman's automatic brake valve and the brake

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pipe, when operating double-heading cock toward double-heading position.

§ 136.566 *Locomotive of each train operating in train-stop, train-control or cab-signal territory, equipped.*—The locomotive from which brakes are controlled, of each train operating in automatic train-stop, train-control, or cab-signal territory shall be equipped with apparatus responsive to the roadway equipment installed on all or any part of the route traversed, and such apparatus shall be in operative condition.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

§ 136.567 *Restrictions imposed when device fails or cut out en route.*—Where an automatic train-stop, train-control, or cab-signal device fails and/or is cut out en route, train may proceed at restricted speed or if an automatic block-signal system is in operation according to signal indication but not to exceed medium speed, to the next available point of communication where report must be made to a designated officer. Where no automatic block-signal system is in use train shall be permitted to proceed at restricted speed or where automatic block-signal system is in operation according to signal indication but not to exceed medium speed to a point where absolute block can be established. Where an absolute block is established in advance of the train on which the device is inoperative train may proceed at not to exceed 79 miles per hour.

§ 136.568 *Difference between speeds authorized by roadway signal and cab signal, action required.*—If for any reason a cab signal authorizes a speed different from that authorized by a roadway signal, when a train enters the block governed by such roadway signal, the lower speed shall not be exceeded.

Inspections and tests, roadway

§ 136.576 *Roadway element.* — Roadway elements, including those for test purposes, shall be gaged monthly for height and alinement, and shall be tested at least once every 6 months.

§ 136.577 *Test, acknowledgment, and cut-in circuits.*—Test, acknowledgment, and cut-in circuits shall be tested at least once every 6 months.

Inspections and tests, locomotive

§ 136.586 *Daily or after-trip test.*—The automatic train-stop, train-control, or cab-signal apparatus on each locomotive operating in equipped territory shall be inspected and tested either once every 24 hours or within 24 hours before departure upon each trip, except that such inspection and tests of the automatic train-stop, train-control, or cab-signal equipment on Diesel-electric and electric locomotives shall not be required provided that periodic tests be made on such locomotives each 6,000 miles, or at intervals of not more than 2 months, whichever shall occur first.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

§ 136.587 *Departure test.*—A test of the automatic train-stop, train-control, or cab-signal apparatus on each locomotive, except locomotives and multiple-unit cars equipped with mechanical trip stop, shall be made over track elements or test circuits on departure of locomotive from its initial terminal and, if locomotive apparatus is cut out between initial terminal and equipped territory, immediately prior to entering equipped territory, to determine if such apparatus is in service and is functioning properly. If such departure test is made by an employee other than engineman, the engineman shall be informed of the results of such test and a record kept thereof.

§ 136.588 *Periodic test.*—Except as provided in § 136.586, periodic tests of the automatic train-stop, train-control, or cab-signal apparatus shall be made at least once every 3 months, and on multiple-unit cars as specified by the carrier, subject to approval by the Commission.

§ 136.589 *Relays.*—At least once every 4 years each relay shall be removed from service, subjected to thorough test, necessary repairs and adjustment made, and shall not be replaced in service unless its operating characteristics are in accordance with the limits within which such relay is designed to operate.

§ 136.590 *Pneumatic apparatus.*—Automatic train-stop, train-control, or cab-signal pneumatic apparatus shall be inspected and cleaned at least once every 6 months.

SUBPART F. DRAGGING EQUIPMENT AND SLIDE DETECTORS AND OTHER SIMILAR PROTECTIVE DEVICES

§ 136.601 *Signals controlled by devices, location.*—Signals controlled by devices used to provide protection against unusual contingencies, such as landslides, dragging equipment, burned bridges or trestles, and washouts shall be located so that stopping distance will be provided between the signal and the point where it is necessary to stop the train.

§ 136.602. *Operation in conjunction with automatic block-signal system.*—Where these devices are in use in automatic block-signal territory they shall be arranged to operate in conjunction with the automatic block-signal system.

NOTE.—Relief from the requirements of this section will be granted upon an adequate showing by an individual carrier. Relief heretofore granted to any carrier by order of the Commission shall constitute relief to the same extent from the requirements of this part.

DEFINITIONS

§ 136.700 *Definitions.*—For the purpose of these rules, standards, and instructions, the following definitions will apply:

§ 136.701 *Application, brake; full service.*—An application of the brakes resulting from a continuous or a split reduction in brake-pipe pressure at a service rate until maximum brake-cylinder pressure is developed. As applied to an automatic or electro-pneumatic brake with speed governor control, an application other than emergency which develops the maximum brake-cylinder pressure, as determined by the design of the brake equipment for the speed at which the train is operating.

§ 136.702 *Arm, semaphore.*—The part of a semaphore signal displaying an aspect. It consists of a blade fastened to a spectacle.

§ 136.703 *Aspect.*—The appearance of a roadway signal conveying an indication as viewed from the direction of an approaching train; the appearance of a cab signal conveying an indication as viewed by an observer in the cab.

§ 136.704 *Aspect, phantom signal.*—An aspect displayed by a light signal, different from the aspect intended, caused by light from an external source being reflected by the optical system of the signal.

§ 136.705 *Bar, locking.*—A bar in an interlocking machine to which the locking dogs are attached.

§ 136.706. *Bed, locking.*—That part of an interlocking machine that contains or holds the tappets, locking bars, cross locking, dogs, and other apparatus used to interlock the levers.

§ 136.707 *Blade, semaphore.*—The extended part of a semaphore arm which shows the position of the arm.

§ 136.708 *Block.*—A length of track of defined limits, the use of which by trains is governed by block signals, cab signals, or both.

§ 136.709 *Block, absolute.*—A block in which no train is permitted to enter while it is occupied by another train.

§ 136.710 *Block, latch.*—The lower extremity of a latch rod which engages with a square shoulder of the segment or quadrant to hold the lever in position.

§ 136.711 *Bond, rail joint.*—A metallic connection attached to adjoining rails to insure electrical conductivity.

§ 136.712 *Brake pipe.*—A pipe running from the engineman's brake valve through the train, used for the transmission of air under pressure to charge and actuate the automatic brake equipment and charge the reservoirs of the electropneumatic brake equipment on each vehicle of the train.

§ 136.713 *Bridge, movable.*—That section of a structure

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bridging a navigable waterway so designed that it may be displaced to permit passage of traffic on the waterway.

§ 136.714 *Cab.*—The compartment of a locomotive from which the propelling power and power brakes of the train are manually controlled.

§ 136.715 *Chain, safety.*—A chain provided for the purpose of preventing the receiver of a continuous inductive automatic train-stop, train-control, or cab-signal device from falling should it become detached from its normal support.

§ 136.716 *Changer, pole.*—A device by which the direction of current flow in an electrical circuit may be changed.

§ 136.717 *Characteristics, operating.*—As applied to electrical apparatus, the measure of the electrical values at which the apparatus operates. (Drop-away, pickup, working value, et cetera.)

§ 136.718 *Chart, dog.*—A diagrammatic representation of the mechanical locking of an interlocking machine, used as a working plan in making up, assembling, and fitting the locking.

§ 136.719 *Circuit, acknowledgment.*—A circuit consisting of wire or other conducting material installed between the track rails at each signal in territory where an automatic train-stop system or cab-signal system of the continuous inductive type with two-indication cab signals is in service, to enforce acknowledgment by the engineman at each signal displaying an aspect requiring a stop.

§ 136.720 *Circuit, common return.*—A term applied where one wire is used for the return of more than one electric circuit.

§ 136.721 *Circuit, control.*—An electrical circuit between a source of electric energy and a device which it operates.

§ 136.722 *Circuit, cut-in.*—A roadway circuit at the entrance to automatic train-stop, train-control, or cab-signal territory by means of which locomotive equipment of the continuous inductive type is actuated so as to be in operative condition.

§ 136.723 *Circuit, line; double-wire.*—An electric circuit not employing a common return wire; a circuit formed by individual wires throughout.

§ 136.724 *Circuit, shunt fouling.*—The track circuit in the fouling section of a turnout, connected in multiple with the track circuit in the main track.

§ 136.725 *Circuit, switch shunting.*—A shunting circuit which is closed through contacts of a switch circuit controller.

§ 136.726 *Circuit, track.*—An electrical circuit of which the rails of the track form a part.

§ 136.727 *Circuit, track; coded.*—A track circuit in which the energy is varied or interrupted periodically.

§ 136.728 *Circuit, trap.*—A term applied to a circuit used where it is desirable to provide a track circuit but where it is impracticable to maintain a track circuit.

§ 136.729 *Cock, double-heading.*—A manually operated valve by means of which the control of brake operation is transferred to the leading locomotive.

§ 136.730 *Coil, receiver.*—Concentric layers of insulated wire wound around the core of a receiver of an automatic train-stop, train-control, or cab-signal device on a locomotive.

§ 136.731 *Controller, circuit.*—A device for opening and closing electric circuits.

§ 136.732 *Controller, circuit; switch.*—A device for opening and closing electric circuits, operated by a rod connected to a switch, derail, or movable-point frog.

§ 136.733 *Current, foreign.*—A term applied to stray electric currents which may affect a signaling system, but which are not a part of the system.

§ 136.734 *Current of traffic.*—The movement of trains on a specified track in a designated direction.

§ 136.735 *Current, leakage.*—A stray electric current of relatively small value which flows through or across the surface of insulation when a voltage is impressed across the insulation.

§ 136.736 *Cut-section.*—A location other than a signal location where two adjoining track circuits end within a block.

§ 136.737 *Cut-section, relayed.*—A cut-section where the energy for one track circuit is supplied through front contacts or through front and polar contacts of the track relay for the adjoining track circuit.

§ 136.738 *Detector, point.*—A circuit controller which is part of the switch operating mechanism and operated by a rod connected to a switch, derail, or movable-point frog to indicate that the point is within a specified distance of the stock rail.

§ 136.739 *Device, acknowledging.*—A manually operated electric switch or pneumatic valve by means of which, on a locomotive equipped with an automatic train-stop or train-control device, an automatic brake application can be forestalled, or by means of which, on a locomotive equipped with an automatic cab-signal device, the sounding of the cab indicator can be silenced.

§ 136.740 *Device, reset.*—A device whereby the brakes may be released after an automatic train-control brake application.

§ 136.741 *Distance, stopping.*—The maximum distance on any portion of any railroad which any train operating on such portion of railroad at its maximum authorized speed, will travel during a full service application of the brakes, between the point where such application is initiated and the point where the train comes to a stop.

§ 136.742 *Dog, locking.*—A steel block attached to a locking bar or tappet of an interlocking machine, by means of which locking between levers is accomplished.

§ 136.743 *Dog, swing.*—A locking dog mounted in such a manner that it is free to rotate on a trunnion which is riveted to a locking bar.

Cross reference: Element, contact. See Receiver.

§ 136.744 *Element, roadway.*—That portion of the roadway apparatus of automatic train-stop, train-control, or cab-signal system, such as electric circuit, inductor, magnet, ramp, or trip arm to which the locomotive apparatus of such system is directly responsive.

§ 136.745 *Face, locking.*—The locking surface of a locking dog, tappet, or cross locking of an interlocking machine.

§ 136.746 *Feature, restoring.*—An arrangement on a power-operated switch movement by means of which power is applied to restore the switch movement to full normal or to full reverse position, before the driving bar creeps sufficiently to unlock the switch, with control lever in normal or reverse position.

§ 136.747 *Forestall.*—As applied to an automatic train-stop or train-control device, to prevent an automatic brake application by operation of an acknowledging device or by manual control of the speed of the train.

§ 136.748 *Hanger, safety.*—A rigid member provided for the purpose of preventing the receiver of a continuous inductive automatic train-stop, train-control, or cab-signal device from falling should it become detached from its normal support.

§ 136.749 *Indication.*—The information conveyed by the aspect of a signal.

Cross reference: Inductor. See Element, roadway.

§ 136.750 *Interlocking, automatic.*—An arrangement of signals, with or without other signal appliances, which function through the exercise of inherent powers as distinguished from those whose functions are controlled manually, and which are so interconnected by means of electric circuits that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

§ 136.751 *Interlocking, manual.*—An arrangement of signals and signal appliances operated from an interlocking machine and so interconnected by means of mechanical and/or electric locking that their movements must succeed each other in proper sequence, train movements over all routes being governed by signal indication.

§ 136.752 *Joint, rail; insulated.*—A joint in which electricial insulation is provided between adjoining rails.

§ 136.753 *Limits, interlocking.*—The tracks between the opposing home signals of an interlocking.

§ 136.754 *Line, open wire.*—An overhead wire line consisting of single conductors as opposed to multiple-conductor cables.

§ 136.755 *Link, rocker.*—That portion of an interlocking machine which transmits motion between the latch and the universal link.

§ 136.756 *Lock, bolt.*—A mechanical lock so arranged that if a switch, derail, or movable-point frog is not in the proper posi-

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tion for a train movement, the signal governing that movement cannot display an aspect to proceed; and that will prevent a movement of the switch, derail, or movable-point frog unless the signal displays its most restrictive aspect.

§ 136.757 *Lock, electric.*—A device to prevent or restrict the movement of a lever, a switch, or a movable bridge, unless the locking member is withdrawn by an electrical device, such as an electromagnet, solenoid, or motor.

§ 136.758 *Lock, electric; forced-drop.*—An electric lock in which the locking member is mechanically forced down to the locked position.

§ 136.759 *Lock, facing-point.*—A mechanical lock for a switch, derail, or movable-point frog, comprising a plunger stand and a plunger which engages a lock rod attached to the switch point to lock the operated unit.

§ 136.760 *Locking, approach.*—Electric locking effective while a train is approaching, within a specified distance, a signal displaying an aspect to proceed, and which prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the movement of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by the signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

§ 136.761 *Locking, electric.*—The combination of one or more electric locks and controlling circuits by means of which levers of an interlocking machine, or switches or other units operated in connection with signaling and interlocking, are secured against operation under certain conditions.

§ 136.762 *Locking, indication.*—Electric locking which prevents manipulation of levers that would result in an unsafe condition for a train movement if a signal, switch, or other operative unit fails to make a movement corresponding to that of its controlling lever, or which directly prevents the operation of a signal, switch, or other operative unit, in case another unit which should operate first fails to make the required movement.

§ 136.763 *Locking, latch-operated.*—The mechanical locking of an interlocking machine which is actuated by means of the lever latch.

§ 136.764 *Locking, lever-operated.*—The mechanical locking of an interlocking machine which is actuated by means of the lever.

§ 136.765 *Locking, mechanical.*—An arrangement of locking bars, dogs, tappets, cross locking, and other apparatus by means of which interlocking is effected between the levers of an interlocking machine and so interconnected that their movements must succeed each other in a predetermined order.

§ 136.766 *Locking, movable bridge.*—The rail locks, bridge locks, bolt locks, circuit controllers, and electric locks used in providing interlocking protection at a movable bridge.

§ 136.767 *Locking, route.*—Electric locking, effective when a train passes a signal displaying an aspect for it to proceed, which prevents the movement of any switch, movable-point frog, or derail in advance of the train within the route entered. It may be so arranged that as a train clears a track section of the route, the locking affecting that section is released.

§ 136.768 *Locking, time.*—A method of locking, either mechanical or electrical, which, after a signal has been caused to display an aspect to proceed, prevents, until after the expiration of a predetermined time interval after such signal has been caused to display its most restrictive aspect, the operation of any interlocked or electrically locked switch, movable-point frog, or derail in the route governed by that signal, and which prevents an aspect to proceed from being displayed for any conflicting route.

§ 136.769 *Locking, traffic.*—Electric locking which prevents the manipulation of levers or other devices for changing the direction of traffic on a section of track while that section is occupied or while a signal displays an aspect for a movement to proceed into that section.

§ 136.770 *Locomotive.*—A self-propelled unit of equipment which can be used in train service.

§ 136.771 *Machine, control.*—An assemblage of manually operated devices for controlling the functions of a traffic-control system; it may include a track diagram with indication lights.

§ 136.772 *Machine, interlocking.*—An assemblage of manually operated levers or other devices for the control of signals, switches, or other units.

Cross reference: Magnet, track. See Element, roadway.

§ 136.773 *Movements, conflicting.*—Movements over conflicting routes.

§ 136.774 *Movement, facing.*—The movement of a train over the points of a switch which face in a direction opposite to that in which the train is moving.

§ 136.775 *Movement, switch-and-lock.*—A device, the complete operation of which performs the three functions of unlocking, operating, and locking a switch, movable-point frog, or derail.

§ 136.776 *Movement, trailing.*—The movement of a train over the points of a switch which face in the direction in which the train is moving.

§ 136.777 *Operator, control.*—An employee assigned to operate the control machine of a traffic-control system.

§ 136.778 *Piece, driving.*—A crank secured to a locking shaft by means of which horizontal movement is imparted to a longitudinal locking bar.

§ 136.779 *Plate, top.*—A metal plate secured to a locking braket to prevent the cross locking from being forced out of the bracket.

§ 136.780 *Plunger, facing-point lock.*—That part of a facing-point lock which secures the lock rod to the plunger stand when the switch is locked.

§ 136.781 *Point, clearance.*—The location on a turnout at which the carrier's specified clearance is provided between tracks.

§ 136.782 *Point, controlled.*—A location where signals and/or other functions of a traffic-control system are controlled from the control machine.

§ 136.783 *Point, stop-indication.*—As applied to an automatic train-stop or train-control system without the use of roadway signals, a point where a signal displaying an aspect requiring a stop would be located.

§ 136.784 *Position, deenergized.*—The position assumed by the moving member of an electromagnetic device when the device is deprived of its operating current.

§ 136.785 *Position, false restrictive.*—A position of a semaphore arm that is more restrictive than it should be.

§ 136.786 *Principle, closed circuit.*—The principle of circuit design where a normally energized electric circuit which, on being interrupted or deenergized, will cause the controlled function to assume its most restrictive condition.

§ 136.787 *Protection cross.*—An arrangement to prevent the improper operation of a signal, switch, movable-point frog, or derail as the result of a cross in electrical circuits.

Cross reference: Ramp. See Element, roadway.

§ 136.788 *Receiver.*—A device on a locomotive, so placed that it is in position to be influenced inductively or actuated by an automatic train-stop, train-control, or cab-signal. roadway element.

§ 136.789 *Relay, timing.*—A relay which will not close its front contacts or open its back contacts, or both, until the expiration of a definite time interval after the relay has been energized.

§ 136.790 *Release, time.*—A device used to prevent the operation of an operative unit until after the expiration of a predetermined time interval after the device has been actuated.

§ 136.791 *Release value.*—The electrical value at which the movable member of an electromagnetic device will move to its deenergized position.

§ 136.792 *Reservoir, equalizing.*—An air reservoir connected with and adding volume to the top portion of the equalizing piston chamber of the automatic brake valve, to provide uniform service reductions in brake-pipe pressure regardless of the length of the train.

Cross reference: Rocker. See Link, rocker.

§ 136.793 *Rod, lock.*—A rod, attached to the front rod or lug of a switch, movable-point frog, or derail, through which a locking plunger may extend when the switch points or derail are in the normal or reverse position.

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(CONT'D ON PAGE 17)

§ 136.794 *Rod, up-and-down.*—A rod used for connecting the semaphore arm to the operating mechanism of a signal.

§ 136.795 *Route.*—The course or way which is, or is to be, traveled.

§ 136.796 *Routes, conflicting.*—Two or more routes, opposing, converging, or intersecting, over which movements cannot be made simultaneously without possibility of collision.

§ 136.797 *Route, interlocked.*—A route within interlocking limits.

§ 136.798 *Section, dead.*—A section of track, either within a track circuit or between two track circuits, the rails of which are not part of a track circuit.

§ 136.799 *Section, fouling.*—The section of track between the switch points and the clearance point in a turnout.

§ 136.800 *Sheet, locking.*—A description in tabular form of the locking operations in an interlocking machine.

Cross reference: Shoe. See Receiver.

§ 136.801 *Shoe, latch.*—The casting by means of which the latch rod and the latch block are held to a lever of a mechanical interlocking machine.

§ 136.802 *Shunt.*—A bypath in an electrical circuit.

§ 136.803 *Signal, approach.*—A roadway signal used to govern the approach to another signal and if operative so controlled that its indication furnishes advance information of the indication of the next signal.

§ 136.804 *Signal, block.*—A roadway signal operated either automatically or manually at the entrance to a block.

§ 136.805 *Signal, cab.*—A signal located in engineman's compartment or cab, indicating a condition affecting the movement of a train and used in conjunction with interlocking signals and in conjunction with or in lieu of block signals.

§ 136.806 *Signal, home.*—A roadway signal at the entrance to a route or block to govern trains in entering and using that route or block.

§ 136.807 *Signal, interlocking.*—A roadway signal which governs movements into or within interlocking limits.

§ 136.808 *Signals, opposing.*—Roadway signals which govern movements in opposite directions on the same track.

§ 136.809 *Signal, slotted mechanical.*—A mechanically operated signal with an electromagnetic device inserted in its operating connection to provide a means of controlling the signal electrically, as well as mechanically.

§ 136.810 *Spectacle, semaphore arm.*—That part of a semaphore arm which holds the roundels and to which the blade is fastened.

§ 136.811 *Speed, medium.*—A speed not exceeding 40 miles per hour.

§ 136.812 *Speed, restricted.*—A speed that will permit stopping short of another train or obstruction, but not exceeding 20 miles per hour.

§ 136.813 *Speed, slow.*—A speed not exceeding 20 miles per hour.

§ 136.814 *Station, control.*—The place where the control machine of a traffic-control system is located.

§ 136.815 *Stop.*—As applied to mechanical locking, a device secured to a locking bar to limit its movement.

§ 136.816 *Superiority of trains.*—The precedence conferred upon one train over other trains by train order or by reason of its class or the direction of its movement.

§ 136.817 *Switch, electropneumatic.*—A switch operated by an electropneumatic switch-and-lock movement.

§ 136.818 *Switch, facing-point.* — A switch, the points of which face traffic approaching in the direction for which the track is signaled.

§ 136.819 *Switch, hand-operated.* — A noninterlocked switch which can only be operated manually.

§ 136.820 *Switch, interlocked.*—A switch within the interlocking limits, the control of which is interlocked with other functions of the interlocking.

§ 136.821 *Switch, sectionalizing.*—A switch for disconnecting a section of a power line from the source of energy.

§ 136.822 *Switch, spring.*—A switch equipped with a spring device which forces the points to their original position after being trailed through and holds them under spring compression.

§ 136.823 *Switch, trailing-point.* — A switch, the points of which face away from traffic approaching in the direction for which the track is signaled.

§ 136.824 *System, automatic block-signal.* — A block-signal system wherein the use of each block is governed by an automatic block signal, cab signal, or both.

§ 136.825 *System. automatic train-control.*—A system so arranged that its operation will automatically result in the following:

A full service application of the brakes which will continue either until the train is brought to a stop, or, under control of the engineman, its speed is reduced to a predetermined rate.

When operating under a speed restriction, an application of the brakes when the speed of the train exceeds the predetermined rate and which will continue until the speed is reduced to that rate.

§ 136.826 *System, automatic train-stop.* — A system so arranged that its operation will automatically result in the application of the brakes until the train has been brought to a stop.

§ 136.827 *System, block-signal.*—A method of governing the movement of trains into or within one or more blocks by block signals or cab signals.

§ 136.828 *System, traffic-control.*—A block-signal system under which train movements are authorized by block signals whose indications supersede the superiority of trains for both opposing and following movements on the same track.

§ 136.829 *Terminal, initial.*—The starting point of a locomotive for a trip.

§ 136.830 *Time, acknowledging.*—As applied to an intermittent automatic train-stop system, a predetermined time within which an automatic brake application may be forestalled by means of the acknowledging device.

§ 136.831 *Time, delay.*—As applied to an automatic train-stop or train-control system, the time which elapses after an automatic brake application is initiated until the brakes start to apply.

§ 136.832 *Train.*—A locomotive or more than one locomotive coupled, with or without cars.

§ 136.833 *Train, opposing.*—A train, the movement of which is in a direction opposite to and toward another train on the same track.

§ 136.834 *Trip.*—A movement of a locomotive over all or any portion of automatic train-stop, train-control, or cab-signal territory between the terminals for that locomotive; a movement in one direction.

Cross reference: Trip-arm. See Element, roadway.

§ 136.835 *Trunking.*—A casing used to protect electrical conductors.

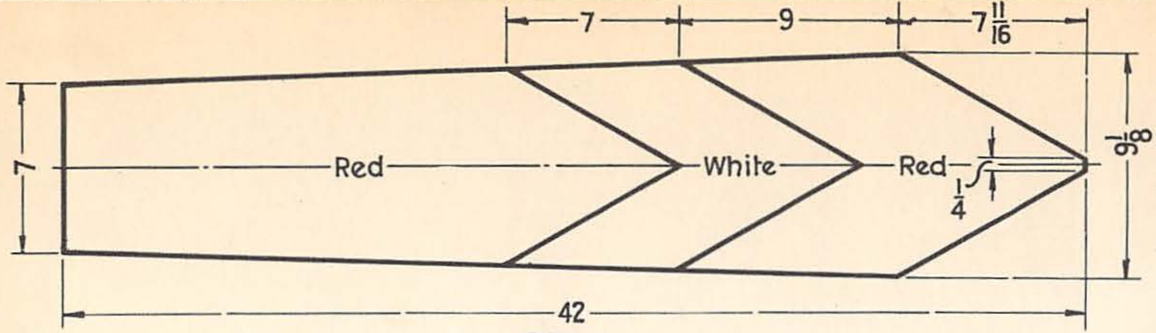
§ 136.836 *Trunnion.*—A cylindrical projection supporting a revolving part.

§ 136.837 *Valve, electropneumatic.*—A valve electrically operated which, when operated, will permit or prevent passage of air.

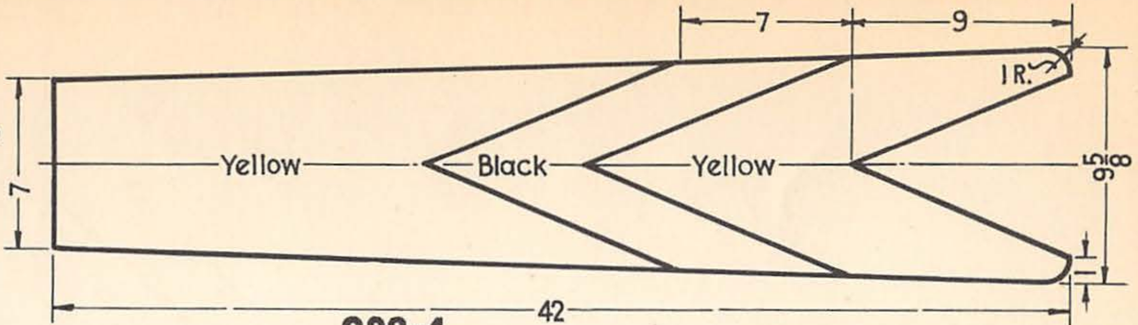
§ 136.838 *Wire, shunt.*—A wire forming part of a shunt circuit.

It is further ordered, That the Commission's order of April 13, 1939, prescribing rules, standards, and instructions be, and it is hereby, vacated and set aside, effective October 1, 1950.

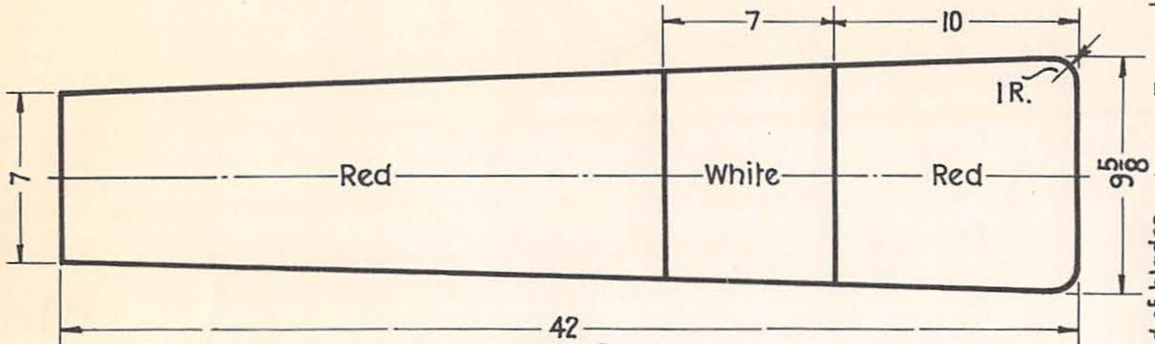
Notice of this order shall be given to the general public by depositing a copy hereof in the office of the Secretary of the Commission at Washington, D. C., and by filing it with the Director of the Division of the Federal Register.


7
9
7 11/16
7
Red
White
Red
1/4
9 1/8
42

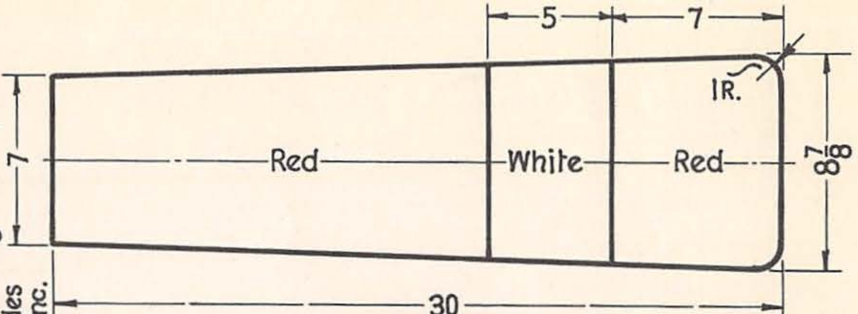
200-1


7
9
1 R.
7
Yellow
Black
Yellow
9 5/8
1 1/2
42

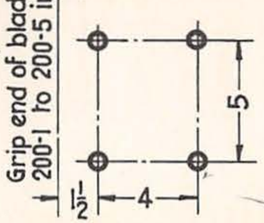
200-4


7
10
1 R.
7
Red
White
Red
9 5/8
42

200-2


5
7
1 R.
7
Red
White
Red
8 7/8
30

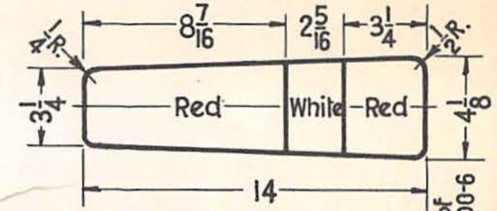
200-3

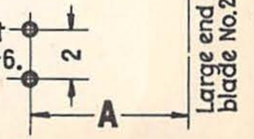

Grip end of blades 200-1 to 200-5 inc.
5
1 1/2
4

Spacing of blade grip bolt holes in spectacle with respect to grip end of blades No. 200-1, 200-2, 200-3, 200-4 and 200-5.

NOTE: Back and edges of all blades to be black.

200-6

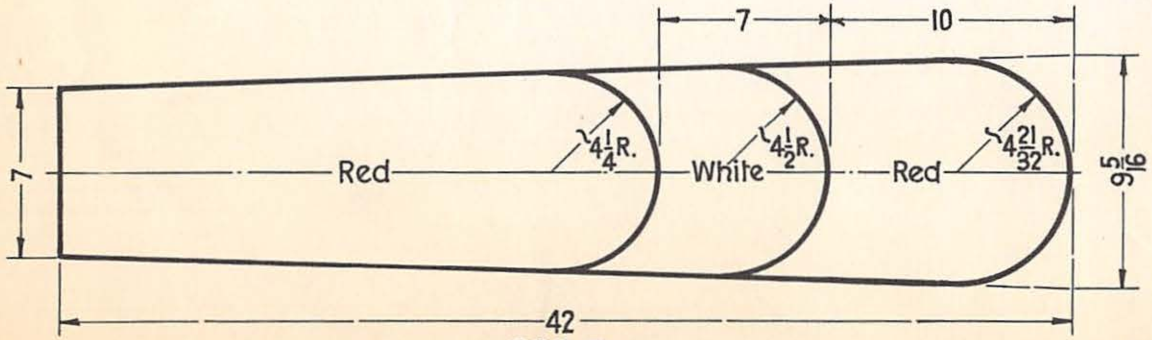

8 7/16
2 5/16
3 1/4
4 1/2 R.
1/2 R.
3 1/4
Red
White
Red
4 1/8
14


2
A
Large end of blade No. 200-6

Spacing of blade grip bolt holes in spectacle with respect to large end of blade No. 200-6.

200-7 ASSEMBLY-A = $2\frac{13}{16}$

200-8 -A = $6\frac{7}{16}$


7
10
7
4 1/4 R.
4 1/2 R.
4 21/32 R.
Red
White
Red
9 5/16
42

200-5

Scale: $1\frac{1}{2}$ ins = 1 ft.

All dimensions given in inches.

When ordering give number shown in large type.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

SIGNAL BLADES

(WOOD OR STEEL)

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(O.G.L.).
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

200

ISSUE	DATE
1	6-16-1921
2	1-13-1932

Approved by Representatives of Lines Shown.

J C Mock
Chairman

WAH

DEPT. 44
MAY
2
1932
U.S. & S. CO.

OPERATING REQUIREMENTS OF ELECTRIC SWITCH MACHINES

Item	Mfgr.	Type	Voltage	A.C. or D.C.	Fuse capacity or time cut out	Approx. time of operation	Overload breaker minimum	Contactor maximum	Master Relay maximum	Controller unit maximum	Clutch slip nominal	Field connections	Remarks
					Amps.	Seconds	Amps.	Amps.	Amps.	Volts	Amps.		
1	U.S.& S.		110	A.C.	10	2.5				90	14		
2	"		110	D.C.		2.5	10			70	12		
3	"	A	24	"		9	18	.25		19	20	SERIES PARALLEL	
4	"	B	24	"		15	11	.25		19	12	"	
5	"	C	24	"		31	7	.25		19	8	SERIES	
6													
7													
8													
9	G.R.S.	4A-B	110	D.C.	15	3					13	SERIES	
10	"	5	110	"	15	3					13	"	
11	"	5A	110	"	15	3					13	"	
12	"	5A	220	"	10	3					9.5	"	
13	"	6	110	"	15	2					20		
14													
15	G.R.S.	5A	110	D.C.	5	15					2	SERIES	
16	"	5A	130	"	10	9					4	"	
17													
18													
19	G.R.S.	5	24	D.C.	15	15					13	SERIES	
20	"	5A	24	"	15	15					13	"	
21	"	5A	24	"	15	9					13	"	
22	"	5B	24	"	15	9					13	SERIES PARALLEL	
23	"	5C	24	"	15	9	10	.043	.100	21	13	"	
24	"	5C	110	"	15	3.5	15	.075	.080	92	20	SERIES	
25													
26		OTHER TYPES	110	D.C.	15						13	SERIES	
27													
28													
29													
30													

Renumbered 205,
was No. 47 Issue: 1
of 10-6-33 (page 3)

OPERATING REQUIREMENTS OF INDICATION MAGNETS

SWITCHES

Item	INDICATION Type	INTERLOCKING MACHINE		Resistance	Operating Values	
		Mfgr.	Type or model		Max.	Min.
				Ohms	Amps.	Amps.
1	D.C. DYNAMIC	G.R.S.	2	1.21	2.00	1.15
2	" DYNAMIC	"	2-UNIT	1.21	2.00	1.15
3	" DYNAMIC	"	5	1.21	2.00	0.90
4	" DYNAMIC	"	5	3.20	1.05	0.48
5	" L.V. BAT.	"	5	13.80	0.70	0.32
6						
7						
8						
9						
10						
SIGNALS FOR MODEL 2 UNIT LEVER AND MODEL 5						
11	D.C. DYNAMIC	G.R.S.	2-UNIT	6.8	.530	.22
12	" L.V. BAT.	"	2-UNIT	12.8	.530	.39
13	" DYNAMIC	"	5	6.8	.530	.22
14	" L.V. BAT.	"	5	19.8	.350	.14
15	" H.V. BAT.	"	5	800	.113	.050
16	" H.V. BAT.	"	2	800	.113	.069
17	" DYNAMIC	"	2-UNIT 2	13.6	.530	.22
18	" DYNAMIC	"	2-UNIT 2	19.8	.530	.22
19						
SWITCH AND SIGNAL						
					Pick-up Maximum	Drop-away Minimum
20	D.C. L.V. BAT.	U.S.&S.	14	130	.068	.022
21	" H.V. BAT.	"	14	2000	.035	.011
22						
23						

SIGNAL AND TRAIN CONTROL COMMITTEE		205
ELECTRIC INTERLOCKING	1 2	7-22-1939 11-29-1939

(CONT'D ON PAGE 4)

GENERAL

1 Tool Board and Equipment in accordance with N. Y. C. S., S. & T. C. C. Plan 2765 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

2 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

3 Materials, tools or supplies must be stored in places provided for that purpose.

4 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

5 Apparatus must be painted as often as required to prevent deterioration.

6 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

7 Gaskets must be kept in good condition.

8 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

9 Ventilators, when in use, must be kept clean to allow free circulation of air.

10 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

11 Parts found defective or not meeting tests required by these instructions must be replaced.

12 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these instructions.

13 Batteries must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

14 Wiring must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

15 Signals must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

16 Electric locks must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions No. 265.

17 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

18 Cotters must be of proper size, kept in place, in good condition and properly spread.

19 Testing device for testing fuses before they are used must be kept in place.

20 Fuses of specified capacity and type must be used and a sufficient supply of tested Fuses kept on hand.

rev'd 10-15-38
renumbered 205,
was old No. 47 of
Issue: I (10-6-33).

TIME RELEASE AND TIME RELAYS

21 Time releases and time relays must be adjusted and maintained to provide time interval specified.

23 They must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS

24 Contact-springs must be adjusted with sufficient pressure so that contact resistance does not exceed 0.01 ohm. Contact surface must be kept clean, without excessive wear and free from pits and burns.

25 Contact adjustments must be maintained as specified on circuit plans.

26 Movement of controller contactor with lever in fixed position must not exceed 3/32 inch.

27 Insulating and other parts must be kept clean and be free of metallic particles caused by wear.

28 Inspection must be made for burned, weakened or other defected parts.

GROUND TESTS

29 Ground tests between positive and ground and negative and ground must be made each day maintainer is on duty, and readings recorded on Form NYCS SC-29.

30 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

31 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

CHANGES OR REPLACEMENTS

32 When replacements or changes are made in switch operating and locking mechanism, signals, cross protection relays, or other parts of the interlocking, tests must be made immediately after they are placed in service to determine that they operate properly and meet the requirements of these instructions.

INTERLOCKING MACHINE

33 Machine cabinet must be kept in good condition. Sections equipped with locking devices must be kept locked.

34 Interlocking machine must be kept clean and free from rust.

35 Mechanical locking must be in accordance with the current locking sheet and dog chart and must be maintained in accordance with N. Y. C. S. S. & T. C. C. Instructions.

36 Levers must operate without undue friction.

37 Lever blocks and markers as shown on N. Y. C. S., S. & T. C. C. Plans 2020 and 2021 must be placed on operating levers that are temporarily not to be operated, or operated with proper precaution. Sufficient number must be available for use as required.

38 Indication mechanism must be tested at least each 6 months to determine that no mechanical or other defects exist which will permit lever (single or double) to be moved beyond indication position until proper indication has been received. Tests shall be made by moving lever several times from full normal and full reverse positions to the indication positions at varying impacts against indication stop. When testing indication mechanism of lever the indication circuit must be opened during test. If any conditions are found that may cause improper operations signalman must be notified immediately, lever blocks, or markers, placed on lever and precautions taken to provide for the safe passage of trains.

ELECTRIC SWITCH OPERATING AND LOCKING MECHANISM

39 Mechanism must be kept clean, inside of case free from grit, foreign matter and excessive oil.

40 Mechanism wiring must be in good condition and arranged to avoid mechanical injury.

41 Switch timbers supporting the switch operating and locking mechanisms must be well tamped to prevent excessive vibration and strains caused by passing trains.

42 Lock and point detector rods must be maintained with minimum lost motion.

43 Mechanism must be operated by hand after repairs, adjustments or replacements are made to determine that there is no undue strain on any part of machine and that it operates properly.

ROUTE LOCKING TESTS

43A With no train approaching the route to be tested and track circuits in the route unoccupied, locking shall be tested as follows:

(a) Line up route.
(b) Reverse signal lever.
(c) Open first track circuit in the route.
(d) Restore signal lever to normal position.
(e) After time or approach locking has released, check that route is locked.
(f) Close first track circuit.

Each route must be tested. Test may be made in conjunction with paragraph 17, N.Y.C.S., S. & T.C.C. Instruction 265.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN
CONTROL COMMITTEE

ELECTRIC INTERLOCKING
INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUT.L.R.R.

205B
7-22-1939
6-17-1952

Approved by Representatives of Lines shown.
Chairman

(CONT'D ON PAGE 2)

44 When repairs, adjustments or replacements are complete or any part of the wiring has been disconnected and mechanism is again ready for service, it must be operated to full normal and full reverse position by its interlocking lever to determine that the switch operating and locking mechanism and indications operate properly and that the movement of the switch follows the movement of its lever.

45 Mechanisms held for emergency use must be kept in good order ready for immediate use.

46 Mechanisms taken out of service for repairs must be disassembled and parts thoroughly cleaned. Wearing surfaces must be examined for wear and evidence of cutting, giving special attention to the motor armature pinion or shaft bearing surfaces. Oil ducts and oil holes must be thoroughly cleaned to insure that wearing parts will be properly lubricated. Current carrying parts must test infinity resistance as between conductors and ground when tested with a megger. The contacts of circuit controllers must be examined and adjusted as required in Instruction 24.

Re-assembled mechanisms must be in good condition, properly lubricated and wiring arranged to avoid mechanical injury. The mechanisms must then be operated by hand to full normal and full reverse position to determine that it operates properly without undue friction.

47 Guide plates for operating bar must not permit of more than 1/16 in. clearance between bar and guide plate.

48 Insulating block for brush holders must be clean and the head of binding posts sealed with insulating compound to prevent electrical leakage.

49 Edges of locking dogs and rods must be maintained with not more than 1/16 in. wear.

50 Guards must be kept in place and in good condition.

51 Connection of motor field coils must not be changed except as instructed by the Signal Supervisor.

52 Contacts of circuit controllers must be inspected frequently to determine if adjusted as required in Instruction 24. Wearing surfaces of slide type controllers must be lubricated by wiping with lint free cloth dampened with signal mechanism oil.

53 Pole changer must be maintained to insure that switch mechanism follows movement of lever by reversing position of lever before switch has completed its stroke. Test to be made for both normal and reverse operation.

54 Point detector must be maintained so that with the switch mechanism locked in normal and/or reverse position it is not possible to open contacts by applying force at the switch points in either direction. Contacts must remain open with ¼ in. obstruction between switch point and stock rail, approximately 6 in. from point.
The machine is to be operated by hand-crank.

mbered 205
as No. 47 Issue: 1
of 10-6-33 (page 2)

55 Switch mechanisms must be maintained so that they meet the requirements shown in Table, page 3. The clutch slippage shall be tested by placing an obstruction between the switch point and stock rail.

MOTOR COMMUTATORS AND BRUSHES

56 Commutators must be smooth, clean and free from oil or grease and have a glossy appearance. When necessary to clean, chamois skin or soft cloth free from lint must be used. Commutators that become rough and cause excessive sparking must be polished with Blitz cloth or other mildly abrasive approved polishing cloth. Emery or carborundum must not be used. Commutators defective or requiring resurfacing must be replaced.

57 Brushes must be of quality and design approved by the Signal Engineer. They must be clean, in proper alignment, move freely in holder or holder move freely on stud, and shaped to fit and rest with full contact surface on commutator or slip rings.

58 Springs must be in place and in good condition to provide proper contact pressure.

59 Worn brushes must be replaced before loss of brush pressure, fouling or binding of brush holder. New brushes must be fitted by drawing No. 00 or finer sand paper between brush and commutator with smooth side of paper toward commutator or slip ring. When brushes have been fitted, parts must be carefully cleaned of dust and grit.

LUBRICATION

60 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that service.

61 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

62 Housing and parts on which forced lubricant is used must be thoroughly cleaned with a non-explosive cleaning solvent at least once each year and new lubricant applied.

63 Where parts are equipped for forced lubrication the parts should be lubricated as often as necessary to provide continuous lubrication of wearing surfaces. Care must be used to know that sufficient pressure is applied to insure that lubricant is forced to all parts of wearing surfaces. When lubricating the lower end of motor spindle of vertical type motors, sufficient lubricant must be forced into bearing to lift armature slightly.

64 Parts not equipped for forced lubrication should be lubricated with an approved grade of oil.

65 Small pins and pivot bearings must be lubricated with signal mechanism oil.

66 Manufacturer's Instructions for lubrication must be followed; the kind and grade of lubricant used first being approved by the Signal Engineer.

POWER OPERATED SWITCH—Adjustments

67 Switch must be adjusted as follows:

(a) Loosen check and adjusting nuts on switch adjustments. Set switch in position to adjust long bar of lock rod.
Bring the notch in bar in line with lock plunger of switch movement. Turn adjusting nut until switch point is tight against main or stock rail, then adjust long lock bar so that its locking notch will line with lock plunger.

(b) Reverse switch and turn adjusting nut until point is tight against main or stock rail. Adjust short bar of lock rod so that its locking notch will line with lock plunger.

(c) Set jam nuts with wrench, tightly against adjusting nuts.

68 Operating rod must be adjusted as follows:

(a) Adjust rod so that switch or frog points fit tightly against stock rails, without excessive pressure, or spring, in both normal and reverse positions.

(b) Make test for this adjustment by operating switch machine by hand.

(c) Set jam nuts with wrench tightly against adjusting nuts.

69 Lock rod must be adjusted as follows:

(a) See that notches in lock rods have dimensions in accord with those shown on standard plans.

(b) Permanently mark for visual indication (when notch is centered with locking dog) rods having notches that are invisible in locking position.

(c) Operate switch by hand to full normal and full reverse position and note that locking dog when entering in locking position is centered in notch.

(d) Set jam nuts, with wrench, tightly against adjusting nuts.

(e) Adjustments on lock rods must be maintained so that switch mechanism will not lock when ¼ in. obstruction is placed between switch point and stock rail, approximately 6 in. from point. The machine is to be operated by hand-crank.

(CONT'D ON PAGE 3)

58 out 1/19/14.

OPERATING REQUIREMENTS OF ELECTRIC SWITCH MACHINES

Item	Mfgr.	Type	Voltage	A.C. or D.C.	Fuse capacity or time cut out	Approx. time of operation	Overload breaker minimum	Contactor maximum	Master Relay maximum	Controller unit maximum	Clutch slip nominal	Field connections	Remarks
					Amps.	Seconds	Amps.	Amps.	Amps.	Volts	Amps.		
1	U.S.& S.		110	A.C.	10	2.5				90	14		
2	"		110	D.C.		2.5	10			70	12		
3	"	A	24	"		9	18	.25		19	20	SERIES PARALLEL	
4	"	B	24	"		15	11	.25		19	12	"	
5	"	C	24	"		31	7	.25		19	8	SERIES	
6													
7													
8													
9	G.R.S.	4A-B	110	D.C.	15	3					13	SERIES	
10	"	5	110	"	15	3					13	"	
11	"	5A	110	"	15	3					13	"	
12	"	5A	220	"	10	3					9.5	"	
13	"	6	110	"	15	2					20		
14													
15	G.R.S.	5A	110	D.C.	5	15					2	SERIES	
16	"	5A	130	"	10	9					4	"	
17													
18													
19	G.R.S.	5	24	D.C.	15	15					13	SERIES	
20	"	5A	24	"	15	15					13	"	
21	"	5A	24	"	15	9					13	"	
22	"	5B	24	"	15	9					13	SERIES PARALLEL	
23	"	5C	24	"	15	9	10	.043	.100	21	13	"	
24	"	5C	110	"	15	3.5	15	.075	.080	92	20	SERIES	
25													
26		OTHER TYPES	110	D.C.	15						13	SERIES	
27													
28													
29													
30													

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OPERATING REQUIREMENTS OF INDICATION MAGNETS

SWITCHES

Item	INDICATION Type	INTERLOCKING MACHINE		Resistance	Operating Values	
		Mfgr.	Type or model	Ohms	Max. Amps.	Min. Amps.
1	D.C. DYNAMIC	G.R.S.	2	1.21	2.00	1.15
2	" DYNAMIC	"	2-UNIT	1.21	2.00	1.15
3	" DYNAMIC	"	5	1.21	2.00	0.90
4	" DYNAMIC	"	5	3.20	1.05	0.48
5	" L.V. BAT.	"	5	13.80	0.70	0.32
6						
7						
8						
9						
10						
SIGNALS FOR MODEL 2 UNIT LEVER AND MODEL 5						
11	D.C. DYNAMIC	G.R.S.	2-UNIT	6.8	.530	.22
12	" L.V. BAT.	"	2-UNIT	12.8	.530	.39
13	" DYNAMIC	"	5	6.8	.530	.22
14	" L.V. BAT.	"	5	19.8	.350	.14
15	" H.V. BAT.	"	5	800	.113	.050
16	" H.V. BAT.	"	2	800	.113	.069
17	" DYNAMIC	"	2-UNIT 2	13.6	.530	.22
18	" DYNAMIC	"	2-UNIT 2	19.8	.530	.22
19						
SWITCH AND SIGNAL						
					Pick-up Maximum	Drop-away Minimum
20	D.C. L.V. BAT.	U.S.&S.	14	130	.068	.022
21	" H.V. BAT.	"	14	2000	.035	.011
22						
23						

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GENERAL

1 Tool Board and Equipment in accordance with N. Y. C. S., S. & T. C. C. Plan 2765 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

2 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

3 Materials, tools or supplies must be stored in places provided for that purpose.

4 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

5 Apparatus must be painted as often as required to prevent deterioration.

6 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

7 Gaskets must be kept in good condition.

8 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

9 Ventilators, when in use, must be kept clean to allow free circulation of air.

10 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

11 Parts found defective or not meeting tests required by these instructions must be replaced.

12 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these instructions.

13 Batteries must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

14 Wiring must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

15 Signals must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions.

16 Electric locks must be maintained in accordance with N. Y. C. S., S. & T. C. C. Instructions No. 265.

17 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

18 Cotters must be of proper size, kept in place, in good condition and properly spread.

19 Testing device for testing fuses before they are used must be kept in place.

20 Fuses of specified capacity and type must be used and a sufficient supply of tested Fuses kept on hand.

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TIME RELEASE AND TIME RELAYS

21 Time releases and time relays must be adjusted and maintained to provide time interval specified.

23 They must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS

24 Contact-springs must be adjusted with sufficient pressure so that contact resistance does not exceed 0.01 ohm. Contact surface must be kept clean, without excessive wear and free from pits and burns.

25 Contact adjustments must be maintained as specified on circuit plans.

26 Movement of controller contactor with lever in fixed position must not exceed 3/32 inch.

27 Insulating and other parts must be kept clean and be free of metallic particles caused by wear.

28 Inspection must be made for burned, weakened or other defected parts.

GROUND TESTS

29 Ground tests between positive and ground and negative and ground must be made each day maintainer is on duty, and readings recorded on Form NYCS SC-29.

30 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

31 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such cause remedied.

CHANGES OR REPLACEMENTS

32 When replacements or changes are made in switch operating and locking mechanism, signals, cross protection relays, or other parts of the interlocking, tests must be made immediately after they are placed in service to determine that they operate properly and meet the requirements of these instructions.

INTERLOCKING MACHINE

33 Machine cabinet must be kept in good condition. Sections equipped with locking devices must be kept locked.

34 Interlocking machine must be kept clean and free from rust.

35 Mechanical locking must be in accordance with the current locking sheet and dog chart and must be maintained in accordance with N. Y. C. S. S. & T. C. C. Instructions.

36 Levers must operate without undue friction.

37 Lever blocks and markers as shown on N. Y. C. S., S. & T. C. C. Plans 2020 and 2021 must be placed on operating levers that are temporarily not to be operated, or operated with proper precaution. Sufficient number must be available for use as required.

38 Indication mechanism must be tested at least each 6 months to determine that no mechanical or other defects exist which will permit lever (single or double) to be moved beyond indication position until proper indication has been received. Tests shall be made by moving lever several times from full normal and full reverse positions to the indication positions at varying impacts against indication stop. When testing indication mechanism of lever the indication circuit must be opened during test. If any conditions are found that may cause improper operations signalman must be notified immediately, lever blocks, or markers, placed on lever and precautions taken to provide for the safe passage of trains.

ELECTRIC SWITCH OPERATING AND LOCKING MECHANISM

39 Mechanism must be kept clean, inside of case free from grit, foreign matter and excessive oil.

40 Mechanism wiring must be in good condition and arranged to avoid mechanical injury.

41 Switch timbers supporting the switch operating and locking mechanisms must be well tamped to prevent excessive vibration and strains caused by passing trains.

42 Lock and point detector rods must be maintained with minimum lost motion.

43 Mechanism must be operated by hand after repairs, adjustments or replacements are made to determine that there is no undue strain on any part of machine and that it operates properly.

ROUTE LOCKING TESTS

43A With no train approaching the route to be tested and track circuits in the route unoccupied, locking shall be tested as follows:

(a) Line up route.
(b) Reverse signal lever.
(c) Open first track circuit in the route.
(d) Restore signal lever to normal position.
(e) After time or approach locking has released, check that route is locked.
(f) Close first track circuit.

Each route must be tested. Test may be made in conjunction with paragraph 17, N.Y.C.S., S. & T.C.C. Instruction 265.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

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ELECTRIC INTERLOCKING

INSTRUCTIONS

Approved by Representatives of Lines shown.
Chairman

(CONT'D ON PAGE 2)

44 When repairs, adjustments or replacements are complete or any part of the wiring has been disconnected and mechanism is again ready for service, it must be operated to full normal and full reverse position by its interlocking lever to determine that the switch operating and locking mechanism and indications operate properly and that the movement of the switch follows the movement of its lever.

45 Mechanisms held for emergency use must be kept in good order ready for immediate use.

46 Mechanisms taken out of service for repairs must be disassembled and parts thoroughly cleaned. Wearing surfaces must be examined for wear and evidence of cutting, giving special attention to the motor armature pinion or shaft bearing surfaces. Oil ducts and oil holes must be thoroughly cleaned to insure that wearing parts will be properly lubricated. Current carrying parts must test infinity resistance as between conductors and ground when tested with a megger. The contacts of circuit controllers must be examined and adjusted as required in Instruction 24.

Re-assembled mechanisms must be in good condition, properly lubricated and wiring arranged to avoid mechanical injury. The mechanisms must then be operated by hand to full normal and full reverse position to determine that it operates properly without undue friction.

47 Guide plates for operating bar must not permit of more than 1/16 in. clearance between bar and guide plate.

48 Insulating block for brush holders must be clean and the head of binding posts sealed with insulating compound to prevent electrical leakage.

49 Edges of locking dogs and rods must be maintained with not more than 1/16 in. wear.

50 Guards must be kept in place and in good condition.

51 Connection of motor field coils must not be changed except as instructed by the Signal Supervisor.

52 Contacts of circuit controllers must be inspected frequently to determine if adjusted as required in Instruction 24. Wearing surfaces of slide type controllers must be lubricated by wiping with lint free cloth dampened with signal mechanism oil.

53 Pole changer must be maintained to insure that switch mechanism follows movement of lever by reversing position of lever before switch has completed its stroke. Test to be made for both normal and reverse operation.

54 Point detector must be maintained so that with the switch mechanism locked in normal and/or reverse position it is not possible to open contacts by applying force at the switch points in either direction. Contacts must remain open with ¼ in. obstruction between switch point and stock rail, approximately 6 in. from point.
The machine is to be operated by hand-crank.

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55 Switch mechanisms must be maintained so that they meet the requirements shown in Table, page 3. The clutch slippage shall be tested by placing an obstruction between the switch point and stock rail.

MOTOR COMMUTATORS AND BRUSHES

56 Commutators must be smooth, clean and free from oil or grease and have a glossy appearance. When necessary to clean, chamois skin or soft cloth free from lint must be used. Commutators that become rough and cause excessive sparking must be polished with Blitz cloth or other mildly abrasive approved polishing cloth. Emery or carborundum must not be used. Commutators defective or requiring resurfacing must be replaced.

57 Brushes must be of quality and design approved by the Signal Engineer. They must be clean, in proper alignment, move freely in holder or holder move freely on stud, and shaped to fit and rest with full contact surface on commutator or slip rings.

58 Springs must be in place and in good condition to provide proper contact pressure.

59 Worn brushes must be replaced before loss of brush pressure, fouling or binding of brush holder. New brushes must be fitted by drawing No. 00 or finer sand paper between brush and commutator with smooth side of paper toward commutator or slip ring. When brushes have been fitted, parts must be carefully cleaned of dust and grit.

LUBRICATION

60 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that service.

61 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

62 Housing and parts on which forced lubricant is used must be thoroughly cleaned with a non-explosive cleaning solvent at least once each year and new lubricant applied.

63 Where parts are equipped for forced lubrication the parts should be lubricated as often as necessary to provide continuous lubrication of wearing surfaces. Care must be used to know that sufficient pressure is applied to insure that lubricant is forced to all parts of wearing surfaces. When lubricating the lower end of motor spindle of vertical type motors, sufficient lubricant must be forced into bearing to lift armature slightly.

64 Parts not equipped for forced lubrication should be lubricated with an approved grade of oil.

65 Small pins and pivot bearings must be lubricated with signal mechanism oil.

66 Manufacturer's instructions for lubrication must be followed; the kind and grade of lubricant used first being approved by the Signal Engineer.

POWER OPERATED SWITCH—Adjustments

67 Switch must be adjusted as follows:

(a) Loosen check and adjusting nuts on switch adjustments. Set switch in position to adjust long bar of lock rod.
Bring the notch in bar in line with lock plunger of switch movement. Turn adjusting nut until switch point is tight against main or stock rail, then adjust long lock bar so that its locking notch will line with lock plunger.

(b) Reverse switch and turn adjusting nut until point is tight against main or stock rail. Adjust short bar of lock rod so that its locking notch will line with lock plunger.

(c) Set jam nuts with wrench, tightly against adjusting nuts.

68 Operating rod must be adjusted as follows:

(a) Adjust rod so that switch or frog points fit tightly against stock rails, without excessive pressure, or spring, in both normal and reverse positions.

(b) Make test for this adjustment by operating switch machine by hand.

(c) Set jam nuts with wrench tightly against adjusting nuts.

69 Lock rod must be adjusted as follows:

(a) See that notches in lock rods have dimensions in accord with those shown on standard plans.

(b) Permanently mark for visual indication (when notch is centered with locking dog) rods having notches that are invisible in locking position.

(c) Operate switch by hand to full normal and full reverse position and note that locking dog when entering in locking position is centered in notch.

(d) Set jam nuts, with wrench, tightly against adjusting nuts.

(e) Adjustments on lock rods must be maintained so that switch mechanism will not lock when ¼ in. obstruction is placed between switch point and stock rail, approximately 6 in. from point. The machine is to be operated by hand-crank.

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58 out 1/19/40.

OPERATING REQUIREMENTS OF ELECTRIC SWITCH MACHINES

Item	Mfgr.	Type	Voltage	A.C. or D.C.	Fuse capacity or time cutout Amps.	Approx. time of operation Seconds	Overload breaker minimum Amps.	Contactor maximum Amps.	Master Relay maximum Amps.	Controller unit maximum Volts	Clutch slip nominal Amps.	Field connections	Remarks
1	U.S.& S.		110	A.C.	10	2.5				90	14		
2	"		110	D.C.		2.5	10			70	12		
3	"	A	24	"		9	18	.25		19	20	SERIES PARALLEL	
4	"	B	24	"		15	11	.25		19	12	"	
5	"	C	24	"		31	7	.25		19	8	SERIES	
6													
7													
8													
9	G.R.S.	4A-B	110	D.C.	15	3					13	SERIES	
10	"	5	110	"	15	3					13	"	
11	"	5A	110	"	15	3					13	"	
12	"	5A	220	"	10	3					9.5	"	
13	"	6	110	"	15	2					20		
14													
15	G.R.S.	5A	110	D.C.	5	15					2	SERIES	
16	"	5A	130	"	10	9					4	"	
17													
18													
19	G.R.S.	5	24	D.C.	15	15					13	SERIES	
20	"	5A	24	"	15	15					13	"	
21	"	5A	24	"	15	9					13	"	
22	"	5B	24	"	15	9					13	SERIES PARALLEL	
23	"	5C	24	"	15	9	10	.043	.100	21	13	"	
24	"	5C	110	"	15	3.5	15	.075	.080	92	20	SERIES	
25													
26		OTHER TYPES	110	D.C.	15						13	SERIES	
27													
28													
29													
30													

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OPERATING REQUIREMENTS OF INDICATION MAGNETS

SWITCHES

Item	INDICATION Type	INTERLOCKING MACHINE Mfgr.	INTERLOCKING MACHINE Type of model	Resistance Ohms	Operating Values Max. Amps.	Operating Values Min. Amps.
1	D.C. DYNAMIC	G.R.S.	2	1.21	2.00	1.15
2	" DYNAMIC	"	2-UNIT	1.21	2.00	1.15
3	" DYNAMIC	"	5	1.21	2.00	0.90
4	" DYNAMIC	"	5	3.20	1.05	0.48
5	" L.V. BAT.	"	5	13.80	0.70	0.32
6						
7						
8						
9						
10						

SIGNALS FOR MODEL 2 UNIT LEVER AND MODEL 5

Item	INDICATION Type	Mfgr.	Type of model	Ohms	Max. Amps.	Min. Amps.
11	D.C. DYNAMIC	G.R.S.	2-UNIT	6.8	.530	.22
12	" L.V. BAT.	"	2-UNIT	12.8	.530	.39
13	" DYNAMIC	"	5	6.8	.530	.22
14	" L.V. BAT.	"	5	19.8	.350	.14
15	" H.V. BAT.	"	5	800	.113	.050
16	" H.V. BAT.	"	2	800	.113	.069
17	" DYNAMIC	"	2-UNIT 2	13.6	.530	.22
18	" DYNAMIC	"	2-UNIT 2	19.8	.530	.22
19						

SWITCH AND SIGNAL

Item	INDICATION Type	Mfgr.	Type of model	Ohms	Pick-up Maximum	Drop-away Minimum
20	D.C. L.V. BAT.	U.S.&S.	14	130	.068	.022
21	" H.V. BAT.	"	14	2000	.035	.011
22						
23						

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G. R. S. CO. TYPES

INDICATION MECHANISMS

70 Indication parts must be removed for examination in accordance with schedule approved by the Signal Engineer. The lever, lever guide and indication parts in Model 2 and 2 unit lever machines must be removed and the indication latch, L-dog, latch spring, cam and cam spring must be replaced with parts approved for use. Parts replaced must be sent to a designated point for gauging and such parts that are fit for use must be returned to stock. Notches for indications and electric locks must be examined for rounded or otherwise distorted locking edges. Lever guides must be carefully examined to determine that pins and studs are in good condition and tight and that guide is not cracked or broken. Levers must be carefully examined for defects and wear. The overall width of a new lever is 1⅞ in. and when wear of 1/32 in. in main body of lever or on ends of any indication detents is detected lever must be replaced. The indication assembly on Model 5 machines must be removed and its parts carefully inspected for wear and breakage. Such parts which are worn enough to possibly permit lever to move past indication position (without indication first being received) must be replaced, the parts properly lubricated and then reassemble. After the assembly has been replaced on lever mechanical test must be made in accordance with Instructions 38 and 71.

71 Levers when assembled and placed in the machine must be tested in accordance with Instruction 38, (25 movements against normal and reverse indication stops shall be minimum for this test). Electrical test must then be made to determine that indication magnets operate properly and meet operating requirements of indication magnets shown on page 3. If operating values do not meet those shown on page 3 tension on latch spring must be adjusted and lever retested as indicated in Instructions 38 and 70.

72 Indication selectors and cross protection relays must be clean, armature mechanically free, wire connections tight and contacts free from pits.

CROSS PROTECTION TESTS

73 Cross protection tests must be made by the Maintainer at least once each 6 months by applying a cross of 20 ohms resistance between normal and reverse control wires at each switch operating and locking mechanism to determine that cross protection is effective before motor starts. This test must be made with lever in full normal and then again with lever in full reverse position. Cross protection relays must not be operated electrically or by hand before making test. After each test and before making additional tests the switch must be operated by lever.

74 Inspector or other designated employe must test cross protection on switches and signals yearly.

(a) To test switch operating and locking mechanism, connect rheostat and ammeter between normal and reverse operating wires at switch and gradually increase current until cross protection relay operates. Cross protection relay must operate before motor starts and the current reading at which cross protection relay operates must not exceed 4.0 amperes for 110 volt and 2.0 amperes for 220 volt machines.

(b) To test semaphore signals, connect rheostat and ammeter in series between positive wire of operating battery and operating wire at signal and gradually increase current until cross protection relay operates. Cross protection relay must operate before motor or solenoid starts and the current reading at which cross protection relay operates must not exceed 4.0 amperes for 110 volt solenoid dwarf and 0.5 amperes for motor, High or Dwarf signals.

(c) Current readings at which cross protection is effective for tests in instructions 74, (a)-(b) must be recorded on Form $\frac{\text{NYCS}}{\text{SC-28}}$

CROSS PROTECTION RELAY AND INDICATION MAGNET TESTS

75 Inspector or other designated employe must test each cross protection relay and indication magnet at least each year and current values and other data required recorded on Form $\frac{\text{NYCS}}{\text{SC-28}}$ An independent low voltage battery is desirable for test energy.

76 Relays and indication magnets must be tested in place on interlocking machine.

77 Battery, ammeter and shunt rheostat must be connected the same as in making Pick-up and Drop-away tests at other D. C. apparatus.

78 Visual inspection must be made to note that armature bearings and other parts are free of rust or foreign matter.

79 Contacts must make evenly and simultaneously and have proper tension when closed.

80 Adjustments must be made to meet operating requirements. Where operating requirements cannot be obtained by adjustment, the relay or indication magnet must be replaced.

81 Cross protection relay must operate to open position on current value of not more than 25 per cent above value shown on name plate.

82 Where operating values are not shown on name plate, values must be obtained from proper authority and permanently marked on relay.

83 Values at which indication magnets operate must be in accordance with those shown on page 3.

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G. R. S. CO. AND U. S. & S. CO. TYPES

SWITCH OPERATING AND LOCKING MECHANISM CONTROLLERS FOR BUS TYPE INTERLOCKINGS

GENERAL

100 Maintainer must, at least once each month, inspect the controllers, wiring and contacts.

101 Operating requirements must be maintained as shown in Table, page 3. Periodical tests being made to determine that the requirements are met.

102 Controllers must be kept clean, and inside free as practicable from moisture. Case, base plate and similar non-working parts must be painted as required to prevent rusting.

103 Paint must not be applied to working parts or insulation. Only approved paint (U. S. & S. Co. Grade 81-E) may be applied to porcelain top plates.

D. C. CONTROLLERS, TYPES F, D AND C—U. S. & S. CO.

104 Oil must not be applied to controllers, except as specified. Rollers, shafts and pivots must operate freely without excessive lost motion.

105 Contact surfaces must meet squarely, be clean, free from pits and burns, and when closed, have proper tension, and compression of not less than 1/32 in.

106 Maintainer must examine the bearings of polar armature, lock roller, neutral armature and contact bar, and when necessary lubricate them with signal mechanism oil.

107 Neutral armature contacts should have opening of ¼ in. when in the de-energized position, and be deflected ⅛ in. from their stops when closed.

108 De-energizing contact (36-38) opening shall be ¼ in. for the outside contacts. The inside contacts shall open at the same time as the corresponding outside contacts.

109 Circuit breaker contact opening should be ½ in. and when circuit breaker is tipped the contact spring should rest against the contact stop. In closing, the contact spring should have a vertical slide of 1/16 in. and when fully closed approximately 12 ounce contact pressure. The circuit breaker contact should be open during the entire period of bridging of the polar motor control contacts. Should the circuit breaker contact close during that time, full operating voltage would be impressed across the field winding of the switch motor resulting in a virtual short circuit.

110 Each set of polar contacts shall engage or compress equal amounts when in either extreme position.

111 Polar armature must be locked in both extreme positions by the locking arm on the neutral armature. This lock should not jar out of engagement by impact of the hand on the polar armature.

112 Relation between de-energizing polar contact and neutral armature contact adjustment must be checked at least annually by reversing the controller slowly, allowing the lock to ride on the lock roller observing that the neutral armature contacts are held closed in all positions in which the lock is riding on the roller. They must close slightly before the polar armature has moved sufficiently to open the de-energizing polar contacts. This will insure that there will be no point at which both the neutral armature contacts, and polar de-energizing contacts are open, or at which the polar contacts would be open and the lock could prevent the polar armature from completing its stroke.

113 With the polar armature set in the middle position, polar de-energizing contacts open, and the polar control circuit is closed, controller should immediately move to the proper extreme position and lock. When energized, the controller should be self-restoring to either position if the neutral armature is held up and the polar armature is reversed by hand.

114 Circuit breaker tripping device must be inspected at least each 3 months to see that pressing the trip armature down slowly will result in tripping the circuit breaker contact, then pick up the neutral armature by hand to see that the latch arm readily engages the latch pin of the circuit breaker.

115 Polar motor control contacts should occasionally be wiped with a cloth moistened with signal mechanism oil.

A. C. CONTROLLERS, MOTOR-DRIVEN—U. S. & S. CO.

116 The A. C. type controller is normally energized and should remain in last operated position with no tendency for contacts to open, if power is disconnected.

117 Indication contacts in space No. 1 shall have an initial pressure of 0.2 ounces against their stops, and shall deflect not less than 3/32 in. from their stops when in full stroke positions. When either contact is just closing, the opposite contact shall be open not less than 1/16 in.

118 Switch motor control contacts in spaces No. 2 and No. 3 shall have not less than 5/16 in. opening when in the full stroke position. In the fully closed position, contacts shall be deflected not less than 1/16 in. from their stops and shall have contact pressure of not less than 5 ounces.

119 The buffer shall be tested at least every 6 months to see that the coil spring has sufficient tension to prevent backward "drift" of the contact bar beyond center position, when the motor is started gently by hand with power off and allowed to rotate freely from the full normal or reverse locked up position. This prevents the opposite switch operating and indication contacts from closing. The buffer element which engages the roller that drives the contact bar should clear the roller approximately 3/32 in. when in either full stroke position.

120 Maintainer must keep motor shaft bearings lubricated with signal mechanism oil.

D. C. CONTROLLERS—G. R. S. CO.

121 The spring suspension system shall be so adjusted to prevent injury to the controller from vibration.

122 Contactor fingers must be adjusted so that the front contact just makes when the armature is .050 in. away from the residual pin in the top pole piece to provide the necessary contact slide. When, due to wear on the contacts there is not sufficient contact slide, the front tip of the finger should be re-adjusted and if necessary new carbon contacts replaced. With the back contact made, there should be approximately .375 in. air gap for 110 volt machines, and .150 in. for low voltage machines.

123 The centering device should be so adjusted that when both contacts are de-energized there is approximately .225 in. front contact opening and .125 in. back contact opening for 110 volt machines, and approximately .090 in. front contact opening and .045 in. back contact opening for low voltage machines.

124 When adjusting over load breaker the front contact must make before the back contact breaks and when fully picked up there must be not less than 1/32 in. air gap between finger and back contact. To secure the make before break of the contacts and necessary air gap when adjustment is changed it may be necessary to bend the back stop of the finger slightly. When adjustments are completed, tests must be made to determine that the operating values are as required in table on page 3.

125 The overload relay must be adjusted to operate in 8 to 12 seconds after the friction clutch starts to slip with normal voltage applied. For low voltage machines employing resilient gears, the relays should be adjusted to operate in 4 to 8 seconds from the time motor armature stops turning. To test relay adjustment, first determine if friction clutch (if used) is correctly set, then block machine and check relay setting for time of pick-up.

126 Defective master relays must be replaced and not repaired in the field.

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GENERAL

1 Electric levers must be maintained in accordance with N.Y.C.S., S.&T.C.C. Instructions 205 Electric Interlocking.

2 Tool board and equipment in accordance with N.Y.C.S., S.&T.C.C. Dwg.2765 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

3 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

4 Materials, tools or supplies must be stored in place provided for that purpose.

5 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

6 Apparatus must be painted as often as required to prevent deterioration.

7 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

8 Gaskets must be kept in good condition.

9 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

10 Ventilators, when in use, must be kept clean to allow free circulation of air.

11 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

12 Parts worn sufficiently to cause excessive lost motion or found defective, or not meeting tests required by these instructions must be replaced.

13 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these or other instructions.

14 N.Y.C.S., S.&T.C.C. Instructions for installation and maintenance of such parts as mechanical locking, electric locks, signals, etc., must be followed.

15 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

16 Cotters must be of proper size, kept in place, in good condition and properly spread.

17 Care must be used to avoid unnecessary strain or damage to threads on binding posts, small machine screws and bolts.

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TIME RELEASES AND TIME RELAYS

18 They must be adjusted and maintained to provide time interval specified.

19 Clock work and mechanically operated time releases must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS

20 Contacts must be kept clean and free from pits and burns and must operate without excessive wear. Contact resistance must not exceed 0.05 ohms.

21 Contact adjustment must be maintained as required by circuit plans.

22 Contact springs must not be bent except when other means are not sufficient to provide proper contact pressure and adjustment. When necessary to bend a contact spring, sharp bends must be avoided.

23 Movement of controller contact with lever or latch in locked position must not be sufficient to permit open contacts to close or closed contacts to open.

24 Insulating and other parts must be kept clean and be free of metallic particles caused by wear or other substance that may cause surface leakage.

25 Wearing surfaces of contacts must be cleaned with lint-free clean rag dampened with approved quality of oil.

26 When circuit controller is mounted on switch and lock movement, it must be adjusted so that the contacts will not close until driving bar has travelled ½ in. past locking position.

GROUND TESTS

27 Ground tests between positive and ground, and negative and ground must be made at least once each week, unless otherwise instructed, and readings recorded on N.Y.C.S., S.&T.C.C. Form SC-29.

28 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

29 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

CHANGES OR REPLACEMENTS

30 When changes or replacements are made in any part of an interlocking that may affect the operation of the plant, tests must be made immediately to determine that proper operation is assured.

INSPECTION AND TESTS

31 Inspection and test of interlocking apparatus must be made as required by current instructions and as frequently as necessary to determine that all apparatus is in proper working order.

INTERLOCKING MACHINES

32 Machine must be kept clean and all unfinished parts painted in required colors.

33 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that purpose.

34 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

35 Latch spring must force latch to normal position; weak springs must be replaced.

PIPE LINES

36 Joints and rivets in pipe lines must be kept tight. Not more than one joint must be made in the same pipe between any two supports. With the lever in the center position, the coupling must be located not less than 12 in. from pipe carriers.

37 Drainage for cranks, crossleads, ends of pipe casings, switches, etc., must be maintained.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

MECHANICAL AND ELECTRO-MECHANICAL INTERLOCKING INSTRUCTIONS

N.Y. C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

210B

7-22-1939
6-17-1952

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Chairman

(CONT'D ON PAGE 2)

G. R. S. CO. AND U. S. & S. CO. TYPES

SWITCH OPERATING AND LOCKING MECHANISM CONTROLLERS FOR BUS TYPE INTERLOCKINGS

GENERAL

100 Maintainer must, at least once each month, inspect the controllers, wiring and contacts.

101 Operating requirements must be maintained as shown in Table, page 3. Periodical tests being made to determine that the requirements are met.

102 Controllers must be kept clean, and inside free as practicable from moisture. Case, base plate and similar non-working parts must be painted as required to prevent rusting.

103 Paint must not be applied to working parts or insulation. Only approved paint (U. S. & S. Co. Grade 81-E) may be applied to porcelain top plates.

D. C. CONTROLLERS, TYPES F, D AND C—U. S. & S. CO.

104 Oil must not be applied to controllers, except as specified. Rollers, shafts and pivots must operate freely without excessive lost motion.

105 Contact surfaces must meet squarely, be clean, free from pits and burns, and when closed, have proper tension, and compression of not less than 1/32 in.

106 Maintainer must examine the bearings of polar armature, lock roller, neutral armature and contact bar, and when necessary lubricate them with signal mechanism oil.

107 Neutral armature contacts should have opening of ¼ in. when in the de-energized position, and be deflected ⅛ in. from their stops when closed.

108 De-energizing contact (36-38) opening shall be ¼ in. for the outside contacts. The inside contacts shall open at the same time as the corresponding outside contacts.

109 Circuit breaker contact opening should be ½ in. and when circuit breaker is tipped the contact spring should rest against the contact stop. In closing, the contact spring should have a vertical slide of 1/16 in. and when fully closed approximately 12 ounce contact pressure. The circuit breaker contact should be open during the entire period of bridging of the polar motor control contacts. Should the circuit breaker contact close during that time, full operating voltage would be impressed across the field winding of the switch motor resulting in a virtual short circuit.

110 Each set of polar contacts shall engage or compress equal amounts when in either extreme position.

111 Polar armature must be locked in both extreme positions by the locking arm on the neutral armature. This lock should not jar out of engagement by impact of the hand on the polar armature.

112 Relation between de-energizing polar contact and neutral armature contact adjustment must be checked at least annually by reversing the controller slowly, allowing the lock to ride on the lock roller observing that the neutral armature contacts are held closed in all positions in which the lock is riding on the roller. They must close slightly before the polar armature has moved sufficiently to open the de-energizing polar contacts. This will insure that there will be no point at which both the neutral armature contacts, and polar de-energizing contacts are open, or at which the polar contacts would be open and the lock could prevent the polar armature from completing its stroke.

113 With the polar armature set in the middle position, polar de-energizing contacts open, and the polar control circuit is closed, controller should immediately move to the proper extreme position and lock. When energized, the controller should be self-restoring to either position if the neutral armature is held up and the polar armature is reversed by hand.

114 Circuit breaker tripping device must be inspected at least each 3 months to see that pressing the trip armature down slowly will result in tripping the circuit breaker contact, then pick up the neutral armature by hand to see that the latch arm readily engages the latch pin of the circuit breaker.

115 Polar motor control contacts should occasionally be wiped with a cloth moistened with signal mechanism oil.

A. C. CONTROLLERS, MOTOR-DRIVEN—U. S. & S. CO.

116 The A. C. type controller is normally energized and should remain in last operated position with no tendency for contacts to open, if power is disconnected.

117 Indication contacts in space No. 1 shall have an initial pressure of 0.2 ounces against their stops, and shall deflect not less than 3/32 in. from their stops when in full stroke positions. When either contact is just closing, the opposite contact shall be open not less than 1/16 in.

118 Switch motor control contacts in spaces No. 2 and No. 3 shall have not less than 5/16 in. opening when in the full stroke position. In the fully closed position, contacts shall be deflected not less than 1/16 in. from their stops and shall have contact pressure of not less than 5 ounces.

119 The buffer shall be tested at least every 6 months to see that the coil spring has sufficient tension to prevent backward "drift" of the contact bar beyond center position, when the motor is started gently by hand with power off and allowed to rotate freely from the full normal or reverse locked up position. This prevents the opposite switch operating and indication contacts from closing. The buffer element which engages the roller that drives the contact bar should clear the roller approximately 3/32 in. when in either full stroke position.

120 Maintainer must keep motor shaft bearings lubricated with signal mechanism oil.

D. C. CONTROLLERS—G. R. S. CO.

121 The spring suspension system shall be so adjusted to prevent injury to the controller from vibration.

122 Contactor fingers must be adjusted so that the front contact just makes when the armature is .050 in. away from the residual pin in the top pole piece to provide the necessary contact slide. When, due to wear on the contacts there is not sufficient contact slide, the front tip of the finger should be re-adjusted and if necessary new carbon contacts replaced. With the back contact made, there should be approximately .375 in. air gap for 110 volt machines, and .150 in. for low voltage machines.

123 The centering device should be so adjusted that when both contacts are de-energized there is approximately .225 in. front contact opening and .125 in. back contact opening for 110 volt machines, and approximately .090 in. front contact opening and .045 in. back contact opening for low voltage machines.

124 When adjusting over load breaker the front contact must make before the back contact breaks and when fully picked up there must be not less than 1/32 in. air gap between finger and back contact. To secure the make before break of the contacts and necessary air gap when adjustment is changed it may be necessary to bend the back stop of the finger slightly. When adjustments are completed, tests must be made to determine that the operating values are as required in table on page 3.

125 The overload relay must be adjusted to operate in 8 to 12 seconds after the friction clutch starts to slip with normal voltage applied. For low voltage machines employing resilient gears, the relays should be adjusted to operate in 4 to 8 seconds from the time motor armature stops turning. To test relay adjustment, first determine if friction clutch (if used) is correctly set, then block machine and check relay setting for time of pick-up.

126 Defective master relays must be replaced and not repaired in the field.

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GENERAL

1 Electric levers must be maintained in accordance with N.Y.C.S., S.&T.C.C. Instructions 205 Electric Interlocking.

2 Tool board and equipment in accordance with N.Y.C.S., S.&T.C.C. Dwg.2765 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

3 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

4 Materials, tools or supplies must be stored in place provided for that purpose.

5 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

6 Apparatus must be painted as often as required to prevent deterioration.

7 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

8 Gaskets must be kept in good condition.

9 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

10 Ventilators, when in use, must be kept clean to allow free circulation of air.

11 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

12 Parts worn sufficiently to cause excessive lost motion or found defective, or not meeting tests required by these instructions must be replaced.

13 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these or other instructions.

14 N.Y.C.S., S.&T.C.C. Instructions for installation and maintenance of such parts as mechanical locking, electric locks, signals, etc., must be followed.

15 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

16 Cotters must be of proper size, kept in place, in good condition and properly spread.

17 Care must be used to avoid unnecessary strain or damage to threads on binding posts, small machine screws and bolts.

TIME RELEASES AND TIME RELAYS

18 They must be adjusted and maintained to provide time interval specified.

19 Clock work and mechanically operated time releases must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS

20 Contacts must be kept clean and free from pits and burns and must operate without excessive wear. Contact resistance must not exceed 0.05 ohms.

21 Contact adjustment must be maintained as required by circuit plans.

22 Contact springs must not be bent except when other means are not sufficient to provide proper contact pressure and adjustment. When necessary to bend a contact spring, sharp bends must be avoided.

23 Movement of controller contact with lever or latch in locked position must not be sufficient to permit open contacts to close or closed contacts to open.

24 Insulating and other parts must be kept clean and be free of metallic particles caused by wear or other substance that may cause surface leakage.

25 Wearing surfaces of contacts must be cleaned with lint-free clean rag dampened with approved quality of oil.

26 When circuit controller is mounted on switch and lock movement, it must be adjusted so that the contacts will not close until driving bar has travelled ½ in. past locking position.

GROUND TESTS

27 Ground tests between positive and ground, and negative and ground must be made at least once each week, unless otherwise instructed, and readings recorded on N.Y.C.S., S.&T.C.C. Form SC-29.

28 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

29 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

CHANGES OR REPLACEMENTS

30 When changes or replacements are made in any part of an interlocking that may affect the operation of the plant, tests must be made immediately to determine that proper operation is assured.

INSPECTION AND TESTS

31 Inspection and test of interlocking apparatus must be made as required by current instructions and as frequently as necessary to determine that all apparatus is in proper working order.

INTERLOCKING MACHINES

32 Machine must be kept clean and all unfinished parts painted in required colors.

33 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that purpose.

34 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

35 Latch spring must force latch to normal position; weak springs must be replaced.

PIPE LINES

36 Joints and rivets in pipe lines must be kept tight. Not more than one joint must be made in the same pipe between any two supports. With the lever in the center position, the coupling must be located not less than 12 in. from pipe carriers.

37 Drainage for cranks, crossleads, ends of pipe casings, switches, etc., must be maintained.

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NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

MECHANICAL AND ELECTRO-MECHANICAL INTERLOCKING
INSTRUCTIONS

N.Y. C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

210B
7-22-1939
6-17-1952

Approved by Representatives of Lines shown.
Chairman

(CONT'D ON PAGE 2)

GENERAL

1 Electric levers must be maintained in accordance with N.Y.C.S., S.&T.C.C. Instructions 205 Electric Interlocking.

2 Tool board and equipment in accordance with N.Y.C.S., S.&T.C.C. Dwg.2765 must be provided for each interlocking. Tools must be kept in place, in good order and ready for immediate use.

3 Emergency material held at each interlocking plant must be kept in good order and ready for immediate use.

4 Materials, tools or supplies must be stored in place provided for that purpose.

5 Buildings and surroundings, the care of which is assigned to the Signal Department must be kept in good order.

6 Apparatus must be painted as often as required to prevent deterioration.

7 Doors and covers must be kept tightly closed to prevent water, dust, foreign matter or snow from entering.

8 Gaskets must be kept in good condition.

9 Wire openings must be sealed to prevent the entrance of rodents, insects, etc.

10 Ventilators, when in use, must be kept clean to allow free circulation of air.

11 Drawings in good order, must be kept at each interlocking showing the interlocking layout, circuit plans, locking sheets and dog charts of the plant as in service.

12 Parts worn sufficiently to cause excessive lost motion or found defective, or not meeting tests required by these instructions must be replaced.

13 Manufacturer's Instructions must be followed for installation and maintenance where they do not conflict with these or other instructions.

14 N.Y.C.S., S.&T.C.C. Instructions for installation and maintenance of such parts as mechanical locking, electric locks, signals, etc., must be followed.

15 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, in good condition and tight.

16 Cotters must be of proper size, kept in place, in good condition and properly spread.

17 Care must be used to avoid unnecessary strain or damage to threads on binding posts, small machine screws and bolts.

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TIME RELEASES AND TIME RELAYS

18 They must be adjusted and maintained to provide time interval specified.

19 Clock work and mechanically operated time releases must be kept clean and lubricated with approved quality of oil.

CIRCUIT CONTROLLERS

20 Contacts must be kept clean and free from pits and burns and must operate without excessive wear. Contact resistance must not exceed 0.05 ohms.

21 Contact adjustment must be maintained as required by circuit plans.

22 Contact springs must not be bent except when other means are not sufficient to provide proper contact pressure and adjustment. When necessary to bend a contact spring, sharp bends must be avoided.

23 Movement of controller contact with lever or latch in locked position must not be sufficient to permit open contacts to close or closed contacts to open.

24 Insulating and other parts must be kept clean and be free of metallic particles caused by wear or other substance that may cause surface leakage.

25 Wearing surfaces of contacts must be cleaned with lint-free clean rag dampened with approved quality of oil.

26 When circuit controller is mounted on switch and lock movement, it must be adjusted so that the contacts will not close until driving bar has travelled ½ in. past locking position.

GROUND TESTS

27 Ground tests between positive and ground, and negative and ground must be made at least once each week, unless otherwise instructed, and readings recorded on N.Y.C.S., S.&T.C.C. Form SC-29.

28 When low voltage battery ground test readings show current greater than 0.001 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

29 When high voltage battery ground test readings show current greater than 0.025 amperes, further tests shall be made to determine cause of excessive current and such causes removed.

CHANGES OR REPLACEMENTS

30 When changes or replacements are made in any part of an interlocking that may affect the operation of the plant, tests must be made immediately to determine that proper operation is assured.

INSPECTION AND TESTS

31 Inspection and test of interlocking apparatus must be made as required by current instructions and as frequently as necessary to determine that all apparatus is in proper working order.

INTERLOCKING MACHINES

32 Machine must be kept clean and all unfinished parts painted in required colors.

33 Wearing surfaces of metal parts that require lubrication must be cleaned before being lubricated, and lubricant must be of kind and grade approved for that purpose.

34 Care must be taken to avoid excessive use of lubricant; a film of oil on wearing surface is all that is required.

35 Latch spring must force latch to normal position; weak springs must be replaced.

PIPE LINES

36 Joints and rivets in pipe lines must be kept tight. Not more than one joint must be made in the same pipe between any two supports. With the lever in the center position, the coupling must be located not less than 12 in. from pipe carriers.

37 Drainage for cranks, crossleads, ends of pipe casings, switches, etc., must be maintained.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

MECHANICAL AND ELECTRO-MECHANICAL INTERLOCKING INSTRUCTIONS

N.Y. C.R.R.
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Chairman

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38 Oil in pipe casings equipped with stuffing boxes must be renewed with approved oil during September or October of each year. Stuffing boxes must be kept in good condition.

39 Pipe lines crossing under tracks must clear base of rail at least 1 in.

40 Each pipe lead shall be supported at intervals of not more than 7 feet.

41 Pipes must be painted as often as necessary to prevent deterioration. Special attention must be given to under side of pipes.

42 Threaded ends must be kept coated with approved quality of grease.

43 Pipe must be level, in proper alignment and carriers adjusted so that pipes operate through rollers without friction or wear.

44 Pipes must be kept free from weeds or other foreign matter.

45 Rollers in pipe carriers must be free to roll when pipe is moved and carriers must be bolted tight to foundations.

46 Tops of pipe carrier foundations must be not less than 2 in. above ground line where practicable.

47 Pipe carrier foundations must be examined each spring for cracks or breaks in concrete and broken ones replaced.

48 Cranks and compensators must work freely, be kept clean, wearing surfaces lubricated, properly centered with throw, and in alignment with pipe line.

SWITCH LAYOUTS

49 Switches, derails, movable point frogs and slip switches must be inspected to determine that they are properly braced and fitted to rail.

50 Switch layouts must be equipped with sufficient anchors to prevent running of points.

51 The Track Department must be notified of any track conditions which may prevent proper operation of switches, facing point locks, derails, movable point frogs or slip switches.

FACING POINT AND BOLT LOCKS

52 Plunger of facing point lock must have stroke of not less than 9 in. It must pass through lock rod at least 6 in. when locked and clear lock rod at least 1 in. when withdrawn.

53 Locking edges of plungers, locking dogs, bars and rods must be maintained with not more than 1/16 in. wear.

54 Facing point locks and bolt locks on switches, movable point frogs and split point derails must be adjusted and maintained so that the plunger will not lock when ¼ in. obstruction is placed between the stock rail and switch point, approximately 6 in. from the point. Tests for this adjustment and report must be made periodically.

55 Signal bar of bolt locks must be against the stop when signal lever is normal.

SWITCH ADJUSTMENT

56 Throw of switches, movable point frogs, split point and lifting derails, except Hayes type must be maintained within ¼ in. less or ½ in. more than that specified by standard plan.

57 Throw rod must be adjusted so that the points are held tightly against stock rails, without excessive pressure or spring in both normal and reverse position.

SWITCH AND LOCK MOVEMENTS

58 The driving bar must have full stroke, so that it travels, both normal and reverse, to the stop position.

59 Bolts holding movement to ties must be kept tight, and ties well tamped.

60 Must be kept clean, wearing surfaces properly lubricated and without excessive lost motion.

DRAWBRIDGES

61 Plunger locks and circuit closers for checking bridge and rail locks for drawbridges must be adjusted to lock only when bridge and rail locking devices are not more than ⅜ in. from normal position.

ROUTE LOCKING TESTS

62 With no train approaching the route to be tested and track circuits in the route unoccupied, locking shall be tested as follows:
(a) Line up route.
(b) Reverse signal lever.
(c) Open first track circuit in the route.
(d) Restore signal lever to normal position.
(e) After time or approach locking has released, check that route is locked.
(f) Close first track circuit.
Each route must be tested. Test may be made in conjunction with paragraph 17, N.Y.C.S., S. & T.C.C. Instruction 265.

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SIGNAL AND TRAIN CONTROL COMMITTEE

NEW YORK CENTRAL SYSTEM

MECHANICAL AND ELECTRO-MECHANICAL INTERLOCKING

210B

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USE	ITEM	VOLTAGE RANGE		MANUFACTURE	ORDERING REFERENCE
		A.C.	D.C.		
PROTECTION OF SIGNAL LAMPS.	1	0 – 15	0 – 25	Fansteel Metallurgical Corporation.	Type L-4, L-5, or equal.
	2	0 – 15	0 – 25	Western Railroad Supply Co.	Type 275-TC, or equal.
SIGNAL CONTROL CIRCUITS.	4	0 – 250	0 – 125	Railroad Accessories Corporation.	Everett Multipath Type-W No. 800, or equal.
	5	0 – 125	0 – 30	Railroad Accessories Corporation.	Raco No. 485 Clearview, or equal.
ACROSS TRACK CONNECTION TO RAIL.	6	0 – 125	0 – 30	Railroad Accessories Corporation.	Raco No. 560 Type-B or equal (hystatic shunt).
SIGNAL POWER TRANSMISSION LINES.	8	110 – 750	—	General Electric Co.	No. 9LA10A202, or equal (single pole-pellet type).
	9	110 – 750	—	General Electric Co.	No. 9LA10A204, or equal (double pole-pellet type).
	11	750 – 9000	—	Westinghouse Electric & Mfg. Co.	No. 1105474 Type-S (autovalve), or equal; Max. 6000 volts.
	12	750 – 9000	—	□ – General Electric Co.	No. 9LA10A4 (pellet type), Min. 3000; Max. 6000 volts.
	13	750 – 9000	—	△ – General Electric Co.	No. 9LA10A5 (pellet type), Min. 6000; Max. 9000 volts.

NOTE: Where other arresters than those shown are to be used the Signal Engineer's approval must be obtained.

MAXIMUM VOLTS	
Ungrounded Neutral	Grounded Neutral
□ = 6000 volts	9000 volts
△ = 9000 volts	12800 volts

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

LIGHTNING ARRESTERS

ORDERING REFERENCES
AND INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

255C

3-8-1941
7-20-1944
6-22-1949

Approved by Representatives of lines shown.

Chairman

Printed in U.S.A.

PURCHASE

1 Electric locks shall be in accordance with A.A.R. Signal Section Specifications except as modified in these Instructions.

GENERAL

2 Lock and its support must be securely fastened so there will be no shifting due to operation of lever or latch.

3 New locks, also where practicable, locks in service shall be provided with clearance requirements, as follows:

(a) Between nuts and washers of adjacent binding posts 3/8 in.

(b) Between current carrying parts and other metallic parts 1/8 in.

(c) Between fixed and movable parts except trunnions, bearing surfaces and magnetic air gaps, sufficient clearance shall be maintained to insure free movement of the movable parts.

4 Covers must be kept in place and locked. Where seals are provided they must be kept in place.

5 Bolts, nuts, dowels, screws, binding posts, rivets, nut locks, jam nuts, etc., must be kept in place, good condition and tight.

6 Cotters must be of proper size, in place, good condition and properly spread.

7 New locks and locks shopped for repairs, the binding posts shall be of corrosion resisting metal size, 14-24 with minimum breaking load of 2300 lbs. except locks for electric interlocking machines where posts may be 10-32 with minimum tensile strength of 1600 lbs.

model 14?

8 Wiring must be protected against mechanical injury.

9 The edges of locking dogs and notches must be examined at least each 6 months for rounded or otherwise distorted locking surfaces.

10 Lock plungers or dogs must not be lubricated.

11 Coils when in place shall be fixed to prevent vibration.

12 Armature end play shall be not less than .010 in. and not more than .020 in.

13 Magnetic air gap must not be changed in the field, and must in no case be less than .010 in.

14 Parts found defective and locks not meeting tests required by these Instructions must be replaced.

CONTACTS

15 Fingers shall meet contact surfaces squarely and simultaneously.

(a) Shall have a slide movement of not less than .010 in. against contact surface.

(b) Opening shall be not less than 1/16 in.

QUADRANTS

16 Armature type for mechanical machines:

The notch in the quadrant or slide bar must be so cut that the locking face will meet squarely against the locking dog. Notch shall be not less than 5/16 in. deep and of length to provide at least 1/4 in. back clearance. With lock de-energized, the locking dog or plunger must engage quadrant or slide bar at least 1/4 in. and must clear bottom of notch in quadrant or slide bar. When lock is energized the locking dog or plunger must clear top of slide bar or quadrant at least 1/32 in.

TESTS

17 Locks must be tested at least once each 3 months to determine that they are effective with lock circuit open and mechanical locking released. Test shall be made by moving lever several times from full normal or full reverse position at varying impacts against electric lock stop.

18 Locks of solenoid gravity drop type must be disassembled at least once each 6 months, plunger, tube and other working surfaces cleaned to insure proper operation. When in place must be tested for free movement of plunger and locking mechanism and as required in paragraph 17.

19 Pick-up and drop-away tests of gravity drop type locks must be made by inspectors at least once a year and in same manner as for D.C. Relays and values recorded on Form SC-12.

20 Operating values of electric locks must be as follows:

First Range Voltage (1 to 30 Volts)

	Operating Requirements			
	SHOP		FIELD	
Resistance Ohms	Max. Pick-up Volts	Min. Drop-away Volts	Max. Pick-up Volts	Min. Drop-away Volts
5 to 50	7.5	2.0	8.5	1.5
51 to 150	7.5	2.5	8.5	2.0
151 to 500	13.5	4.0	14.5	3.5
501 to 1000	20.0	6.5	21.0	7.5

21 Locks must meet shop requirements when placed in service, except in emergency, locks meeting field requirements may be used.

22 Insulation resistance between current carrying parts and between current carrying parts and metal parts of lock must measure infinity when tested with megger.

LATCH LOCK ADJUSTMENT

23 On Mechanical Interlocking Switch and F.P.L. Levers:

(a) Latch block lift to permit operation of lever must not be less than 3/4 in.

(b) With electric lock de-energized and mechanical locking released, and with force applied to lever latch, the latch block lift must be not less than 7/16 in. nor more than 8/16 in.

(c) To insure that locking dog of electric lock can drop freely into notch with reasonable clearance, the mechanical locking under the loosest locking condition must prevent lift of lever latch block more than 5/16 in.

(d) The maximum movement of lever latch block with lock quadrant or slide bar held stationary must not exceed 1/8 in.

24 On Mechanical Interlocking Signal Levers: Locks on signal levers must be adjusted to hold latch block not less than 5/8 in. from full normal or full reverse position as required by circuit plan.

Lock mechanism connections

Latch up

SIGNAL AND TRAIN CONTROL COMMITTEE

NEW YORK CENTRAL SYSTEM

ELECTRIC LOCKS

INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

265

1	8-15-1939
2	1-15-1940

Approved by Representatives of Lines shown.

Chairman

(CONT'D ON PAGE 2)

After N.Y.C. L-21

ITEM	LUBRICATION OF	NAME	ORDERING REFERENCE
1	Signals (power)—Parts of interlocking machines—Switch machines G.R.S.Co.—Switch machine bearings, U.S.&S.Co. (except gears, see item 3)—Switch circuit controllers—Time releases (except clockwork and relay)—Oil buffers for signals (not equipped with alemite fittings).—Electric gate mechanisms.	Semaphore oil.	N.Y.C.S., Spec. 1206-B, Class 20; Grade—A (1 Qt. screw top sealed cans).
2	Air buffers for signals, U.S.&S.Co., Styles B and S—Shaft bearings, U.S.&S.Co., Style T-2 signal mechanism.	Graphite semaphore lubricant.	(Specialty) U.S.&S.Co. U.S.&S.Co., Spec. 2553.
3	Switch machine gears, U.S.&S.Co. Styles—Electric gate bearings and gear teeth.	Low temperature grease.	(Specialty) Texaco No. 67.
4	Apparatus equipped with alemite fittings: Switch machines—Switch circuit controllers—Car retarder pins and bearings for G.R.S.Co. Types A and B.	Cup grease.	N.Y.C.S., Spec. 1206-B, Class 55; Grade—A.
5	Relays, G.R.S.Co. Types—Color light signal mechanisms—Clockwork time releases—Other delicate apparatus.	Relay oil.	(Specialty) G.R.S.Co. G.R.S.Co., Dwg. No. 51347-10, Gr. 1. (1 oz. bottles).
6	Relays, U.S.&S.Co. Styles—Color light signal mechanisms—Clockwork time releases—Other delicate apparatus.	Relay oil.	(Specialty) U.S.&S.Co. U.S.&S.Co., Pc. 220699. (1 oz. bottles).
7A	Code transmitters, U.S.&S.Co. Styles.	Brake cylinder grease.	N.Y.C.S., Spec. 1206-B, Class 71.
8	Car retarder gears in base of mechanisms for G.R.S.Co. Types A and B.	Car retarder oil.	N.Y.C.S., Spec. 1206-B, Class 25.
9	Car retarder pistons, U.S.&S.Co. Models.	Brake cylinder grease.	N.Y.C.S., Spec. 1206-B, Class 71.
10	Car retarder bearings, U.S.&S.Co. Model 31.	Pressure gun grease.	N.Y.C.S., Spec. 1206-B, Class 58.
11	Leadouts—Pipe lines—Switches and connections—Mechanical signals—Car retarders, sliding bearing surfaces of U.S.&S.Co. Model 28.	Black oils.	N.Y.C.S., Spec. 1206-B, Class 11. Grade-S, Summer use. Grade-W, Winter use.
11A	Car retarders, sliding bearing surfaces of G.R.S.Co. Types A and B.	Texayce No. 1559.	The Texas Oil Company.
12	Gas engine crank cases (water cooled)—Motor cars (mix with gas).	Motor oils.	N.Y.C.S., Spec. 1206-B, Class 4. Summer use: Grade 30, 40 and 50. Winter use: Grade 10 or 20.
13	Power Bonding machines.	Grease; Trojan A-3	(Specialty) Cities Service Co.
14	Generators—Motors—Etc.	Refrigeration oil.	N.Y.C.S., Spec. 1206-B, Class 19.
15	Underground pipes.	Fuel oil.	N.Y.C.S., Spec. 1370-B, Class 1.
16	Negative power circuit controllers at drawbridges (Electric Division only).	Graphol—BCC.	(Specialty) Graphol Products Co., 408 DeKalb Ave., Brooklyn, N.Y. (1 Pt. containers).
17	Spring switch buffers:		
	Pettibone Mulliken Corporation—	Buffer oil.	(Specialty) P.M. Cor., PM 4710.
	Ramapo Ajax—	Buffer oil.	(Specialty) U.S.&S.Co., Spec. 168.
	Union Switch & Signal Company.	Buffer oil.	(Specialty) U.S.&S.Co., Spec. 168.

MISCELLANEOUS

ITEM	USE	NAME	ORDERING REFERENCE
20	Protection against salt brine and rust—Application to derailing surface of block-type derails.	Grease; Grade-A. Special No-Ox-Id.	(Specialty) Dearborn Chemical Co. (5 Gal. containers).
21	Rust bound bolts and equipment.	Penetrating oil.	Formula No. 1—General Storekeeper, West Albany, N. Y. Manufactured at West Albany Shops.
22	Rusty rail.	Gulf penetrating oil.	(Specialty) Gulf Refining Co.
23	Tie plates—Switch rods and other rods around switches, derails and M.P. Frog, Etc., except insulations.	Track oil.	N.Y.C.S., Spec. 1206-B, Class 21.
24	Transformers—Oil Switches.	Transil oil.	(Specialty) General Electric Co. GE-10-C. (1 and 5 Gal. cans).
25	Impedance Bonds.	Impedance Bond oil. Petrolatum (For G.R.S.)	(Specialty) U.S.&S.Co., Spec. 2455. Socony-Vacuum Oil Co. Spec. 2295-1A.
26	Various.	Lard oil.	N.Y.C.S., Spec. 1206-B, Class 12.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

325D

7-16-1938
7-9-1941
6-11-1945
2-15-1951

OILS AND GREASES

ORDERING REFERENCES

Approved by Representatives of lines shown.

Chairman.

Printed in U.S.A.

The joint use of poles for power, Communication and Signal Circuits on Railroad property shall be in accordance with A.A.R. Communications Section Specification 1-A-24 and the following procedure shall govern:

1. The Communications Department shall be advised prior to the addition of Signal Control, charging, supply, coded control or carrier circuits to be installed on Communications pole lines by the Signal Department and the approval of the Superintendent of Communications shall be obtained.

2. The Signal Department shall furnish crossarm and/or pin space requirements of circuits to be added, together with voltage, power transmitted, and characteristics of circuits to be employed.

3. In the event transpositions are required in the Signal Department circuits, the Communications Department will furnish the transposition information.

4. Subject to the approval of the Superintendent of Communications, railroad signal wires of less than 150 volts may be placed on the lowest communication crossarm if a separate signal crossarm is impracticable and pin space is available and not contemplated for use by the Communications Department.

5. Subject to the approval of the Superintendent of Communications, single-phase a-c circuits carrying less than 150 volts between conductors may be placed on the lowest communication crossarm, installed on the end and adjacent pins if a separate signal crossarm is impracticable and said pin space is available and not contemplated for use by the Communications Department. When so installed, such wires shall be rendered conspicuous by the use of the brown insulator or letter as described in Item 6.

6. Railroad signal single-phase a-c or 2 wire d-c circuits carrying voltages of 150-550 volts between conductors with transmitted power not in excess of 3200 watts may be installed in a position below the communication circuits on the end and adjacent pins of the lowest through signal crossarm spaced at least 24 inches below the lowest communication crossarm and will be identified by:

Preferred (a)	Brown porcelain insulator.
Alternate (b)	Aluminum letter "P" secured to the crossarm between the two wires at every 5th pole. In the three wire systems, two letters will be used.

7. When the use of signal or supply wires on communication crossarms is contemplated, the size of such wires shall not exceed No. 8 AWG DBWP wire.

Approved for Communications Dept:

SUPT. OF COMMUNICATIONS

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

364A
12-23-1952

SIGNAL DEPARTMENT WIRES ON COMMUNICATION DEPARTMENT POLE LINES
INSTRUCTIONS

Approved by Representatives of lines shown.
J J Corcoran
Chairman.

Printed in U.S.A.

365A (1-18-1943
Supersedes NYCRR
plans-Index L-8 of
6-1-1934 and L-10 of
11-10-1936

ESTIMATES, AFE's: AND ROE's:

1 (a) Estimates (both Telegraph and Signal Departments) shall be based upon joint inspection by representatives of the Signal and Telegraph Departments. Ample notice of inspection must be given to permit representatives to make necessary arrangements. Telegraph Department shall furnish to Signal Department representative necessary information as to the number and size of additional guy wires and anchors, if any, required on account of signal lines on joint pole line, and the estimated expense involved. If Signal Department is to furnish necessary material this should be arranged at the time of the inspection. After the inspection the Signal Department will furnish estimate of cost, including labor and material, to the Telegraph Department covering all wire work to be performed by the Signal Department forces so that the Telegraph Department will have full information required, not only to satisfy the Telegraph Department—Western Union Estimate or Job Routine, but also to satisfy the requirements of Railroad AFE and ROE routine as between Signal and Telegraph Departments.

(b) All work in adding or removing signal wires must be performed by Signal Department employes, all additional material for such wires—including line wire, crossarms, pins, insulators, and line drop materials—shall be requisitioned by the Signal Department. The joint inspection report should make clear regarding Signal Department materials to be furnished by both the Railroad and the Western Union separately.

(c) On small jobs where it may be inconvenient for representatives of both Signal and Telegraph Departments to agree upon a date for joint inspection, or for other reasons, it will be satisfactory for the Telegraph Department representatives to make the inspection, after ascertaining that they are informed as to any change in requirements of the Signal Department that may be involved, and when the inspection is completed notify the Signal Department as to the number of poles and the locations of them involving signal line drops which it is planned to move and which will require new line drops. When Telegraph Department notifies Signal Department they should at the same time secure any Signal Department cost information required.

(d) Railroad AFE's covering work chargeable to both Telegraph and Signal Departments shall be approved by Signal Engineer and Superintendent of Telegraph before going to the Management, therefore, the Department in charge of the project will arrange to handle with the other Department accordingly for this approval.

(e) In rebuilding joint lines, careful consideration should be given to the location of poles to which are attached signal line drops. If possible, new poles should be located to permit use of old line drop.

FIELD WORK:

2 (a) The contract between the Railroad Company and the Western Union Telegraph Company places the construction, reconstruction, maintenance and repair of the telegraph pole lines and wires under the supervision and control of the Superintendent of Telegraph. It gives the Railroad right to place signal and local telephone wires on the pole lines subject to the proper regulations.

(b) The Maintenance Foreman of the Telegraph Department under the General Foreman and Superintendent of Telegraph are in direct charge of the lines within their respective territories and are responsible for all work done.

(c) The stringing of new signal wires, placing of crossarms, pins and insulators must be done by Signal Department forces after a joint inspection of the work has been made by the Telegraph Department Maintenance Foreman or their inspectors and the Signal Department representative, and after such changes have been made in the pole line by the forces of the Superintendent of Telegraph as may be necessary to meet specifications for the safe maintenance of the line under the additional loading required.

(d) In the reconstruction or repair of pole lines carried on by the Telegraph Department, the signal wires, crossarms, pins and insulators must be handled by the Signal Department employes: IN HANDLING THIS WORK, THE TELEGRAPH FORCES MUST NOT UNDER ANY CONDITIONS CROSS UP, CONNECT OR DISCONNECT ANY SIGNAL WIRES.

CONSTRUCTION DATA:

3 (a) Western Union Specification 800-C, Section C-3, provides as follows:

"NORMAL VERTICAL CLEARANCE ALONG RAILROAD RIGHT-OF-WAYS.

On level right-of-way the lowest crossarm shall ordinarily have a vertical clearance above ground of not less than 10 feet. In hilly or irregular country the lowest crossarm should be attached at such a height as to provide safe clearance for the wires at all times."

(It is understood that the lowest crossarm referred to in above is the crossarm carrying signal wires and that signal power lines with 550 volt, 3200 watt, maximum are included.)

APPROVED: January 18, 1943

S. L. Van Akin N.Y.C.R.R.
Superintendent of Telegraph

B.&A.R.R.
Superintendent of Telegraph

J. H. Wood. P.&L.E.R.R.
Superintendent of Telegraph

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

POLE LINES JOINT WITH W.U.
ESTIMATES, MATERIALS AND FIELD WORK
WHERE SIGNAL AND TELEGRAPH DEP'TS
ARE CONCERNED
—INSTRUCTIONS—

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.

365A
1-18-1943

Approved by Representatives of Lines shown.
J. J. Corcoran
Chairman

1 Relays purchased under this specification shall be in accordance with the following A.A.R. Signal Section specifications except as herein modified.

SPECIFICATION	DESCRIPTION
105	Tractive armature direct current neutral relay with 2 or more contact fingers.
154	Tractive armature direct current neutral relay for series line approach lighting.
165	Tractive armature direct current polarized relay.
185	Flasher relay.
186	Tractive armature direct current neutral interlocking relay.

2 Relay operating characteristics must not be less than the minimum nor more than the maximum manufacture values shown on the N.Y.C.S., S. & T.C.C. Requirement Tables.

3 Relay assembly details shall be provided in accordance with data shown on N.Y.C.S., S. & T.C.C. Requirement Tables.

4 The magnetic structure shall be of silicon steel having silicon content between 2.25 and 4.5 per cent.

PHYSICAL AIR GAP—NEUTRAL ARMATURE

5 (a) A minimum physical air-gap of 0.013 inch must be provided by hard-drawn bronze stop pin or pins approximately ⅛ inch in diameter so fixed and located in the armature that the pin or pins engage the core or an insulated stop near the edge of the core farthest from the bearings and where a single stop is used midway between the bearings.
If the armature trunnions are adjustable, stop pins that engage the cores must do so not less than 1/32 inch nor more than ¼ inch from the edge of the cores farthest from the bearings.

(b) Where the stop pin engages the insulating stop, the pin shall not extend beyond the edge of the bearing surface of the stop when the relay is fully energized.

(c) Non-adjustable hard-drawn bronze safety stop pins, protruding from the upper side of the armature shall be provided and so located to prevent the reduction of the air-gap to less than .010 inch where the stop pin or pins engage the core, or not less than .008 inch where stop pin engages an insulated stop.

6 Where special relays are used having less than .013 inch minimum physical air-gap, the safety stop pins shall prevent reduction of the air-gap proportionately but not less than .004 inch.

PHYSICAL AIR-GAP—POLAR ARMATURE

7 Minimum physical air-gap for polar armature:

(a) For relays with 2 normal and 2 reverse polar contacts shall be .013 inch between polar armature and neutral cores and maintained by hard-drawn bronze stop pins approximately ⅛ inch diameter.

(b) For relays with 4 normal and 4 reverse polar contacts shall be .006 inch between polar armature and neutral cores and maintained by hard-drawn bronze stop pins approximately ⅛ inch diameter.

(c) For all relays shall be .015 inch between polar armature and permanent magnet pole.

8 Flasher Relay.

(a) Minimum physical air-gap as shown on requirement table shall be provided.

9 Finish.

(a) Metal parts shall be protected against corrosion with nickel plating, or the equivalent, except where the parts used are inherently resistant to corrosion or where such protection may interfere with proper operation of relay. Zinc or cadmium plating must not be used within enclosure of relay except on base plate and corner posts. Zinc or cadmium plating as an undercoating for final coating of tin may be used on other than current carrying parts.

10 Relays shall be equipped for wall mounting unless otherwise specified.

11 When specified, relays shall be furnished with shock absorbing springs of an approved type.

12 Relays shall be furnished with binding post designation in accordance with Plan 6780.

13 Binding post shall be in accordance with A.A.R. Signal Section Plan 1070. Unless otherwise specified, minimum tensile strength shall be 2300 lbs.

14 Gaskets shall be rubber or of approved type.

15 Breathers shall not be provided unless specified.

ORDERING REFERENCE

16 D.C. Relays, N.Y.C.S., S. & T.C.C. Specification 390. QUANTITY-TABLE No.-DESCRIPTION-OHMS.

PURCHASE LIST

17 Relays approved for purchase under this specification are shown on D.C. Relay Purchase List, Specification 390.

INSTRUCTIONS

18 Requirement Tables (Form SC-48) shall be prepared, table number assigned and lithographs furnished for all relays by the Secretary of the N.Y.C.S., Signal and Train Control Committee. When new tables are required, the System Line desiring requirement table will furnish the Secretary of the System Committee Form SC-48 properly filled out to cover the characteristics of the relay for which the table is required.

19 The field operating values shown on the requirement tables are determined by the following method except as specified otherwise on the requirement table.

(a) Minimum drop-away:

KIND OF RELAY	PER CENT OF MANUFACTURE VALUE
Track relay, size 2, with silicon steel structure	87½
Other track relays with silicon steel structures	82
Track relays with swedish iron structures	73
Line relays with silicon steel or swedish iron structures	70
(b) Maximum pick-up and maximum working for neutral and polar armatures:	
Track relays with silicon steel or swedish iron structures	110
Line relays with silicon steel or swedish iron structures.	110

INSPECTION AND TEST—GENERAL

20 Coils must be secured in place to prevent their being damaged due to vibration.

21 Flexible connection from binding post to contact finger must be so formed and attached as not to affect the pick-up and drop-away of the relay.

22 Finger contacts must meet fixed contact surfaces squarely and practically simultaneously.

23 Metal support of non-fusible contact element shall be not less than 1/16 inch from the contact surface.

24 Minimum physical air-gap shall be in accordance with paragraphs 5, 6, 7 and 8.

25 Determine by actual operation that relay has a positive drop-away and contacts open without retardation of movement due to friction or other cause.

26 Determine by observing the operation of relay that at least ⅛ inch clearance exists between case and moving parts.

27 Meters for testing relays shall be checked frequently and calibrated when necessary.

28 When taking current readings, voltmeter must be disconnected. When taking voltage readings, voltmeter must be across coils of relay.

29 Relay operating characteristics must be in accordance with operating values as shown on the requirement table.

30 Pick-up, drop-away and working current or voltage of relays must be determined as follows:

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P. & L.E.R.R.

390C

4-30-1941
7-15-1944
6-29-1950

D. C. RELAYS
TRACTIVE ARMATURE TYPE
SPECIFICATION AND INSTRUCTIONS

Approved by Representatives of Lines shown.
Chairman

(a) Neutral Armature:

1. Initial charge as specified on the requirement table shall be applied in the polarity indicated on Plan 6780 for a period of 20 seconds, except for field test of line relays, the service voltage from its normal source of energization may be used for initial charge.

2. Drop-away:
Gradually reduce initial charge until front contacts open.

3. Normal pick-up:
Open circuit momentarily then apply energy in same direction and gradually increase until front contacts just close.

4. Normal working:
Gradually increase energy until armature stop pin or pins strike the stop.

5. Reverse pick-up when required by table:
Apply initial charge as in Para. (a) 1., gradually reduce energy to zero, reverse polarity, then gradually increase energy until contacts just close.

6. Reverse working when required by table:
Gradually increase energy until armature stop pin or pins strike the stop.

(b) Polar Armature:

1. Pick-up and working:
Apply initial charge as in Para. (a) 1., gradually reduce energy to zero, reverse polarity, then gradually increase energy until contacts are closed in opposite position with armature against stop pin or pins. Reverse initial charge and determine values for opposite direction.

2. The maximum polar pick-up and working value shall not exceed 70 per cent for shop and 77 per cent for field of the lowest pick-up value of the neutral armature and the lowest pick-up and working value of the polar armature shall not be less than 80 per cent for shop and 70 per cent for field, of the value for the opposite position of the polar armature.

3. Polar armature must remain in last operated position with contacts fully compressed when relay is de-energized.

(c) Motor Relay, 3 Position:

1. Normal and reverse pick-up:
Apply energy in direction desired and gradually increase until contacts just close.

2. Normal and reverse working:
Gradually increase energy until armature is against stop.

3. Drop-away:
Gradually reduce energy until contacts are centered in the de-energized position.

SHOP

31 Paragraphs 20 to 30 inclusive shall apply.

32 Test and inspect relay for defects, giving special attention to those noted on the Repair Tag, Form SC-9.

33 The insulation resistance between all current carrying and other metal parts shall be infinity.

34 At 68 deg. F., the percentage variation in the resistance of individual coils must not exceed:

(a) For 5 ohms or less, plus or minus 5 per cent.

(b) Above 5 ohms, plus or minus 10 per cent.

35 Inspect and clean trunnions and bearings, replace any that are worn or defective.

36 Inspect and clean contacts, replace any that are defective.

37 Release Time:
Apply voltage as specified on requirement table and measure the time from opening of coil circuit until front contacts open.

38 Pick-up Time:
Apply voltage as specified on requirement table and measure the time from closing of coil circuit until front contacts close.

39 Reversal Time for Polarized Relays:
Apply voltage as specified on requirement table, reverse voltage and measure the time neutral front contacts are open during reversal of current in the coil circuit.

40 For timing tests of relays, voltage as specified on requirement table must be obtained by using a minimum number of battery cells and potentiometer method for adjusting the applied voltage.

41 Contact Capacity:

Contact carrying capacity as shown on the requirement table is the maximum current, either AC or DC, which each contact will carry continuously and make and break, in a non-inductive circuit at voltage specified.

42 Contact Materials:

Name	Abbreviation
Silver	S
Carbon	C
Silver Gauze	SG
Silver Impregnated Carbon	SIC
Silver Platinum	SP

43 Contact Compression:

(a) Compression is the deflection of the contact finger due to the movement of the armature after contact is just closed. Compression is measured at the armature stop pins by use of a thickness gage.

(b) Front contact compression should be obtained as follows:

1. Place a gage of thickness specified in compression column on requirement table, between the front stop pin or pins and the stop.

2. The gage should be held in place by pressure applied by energizing the relay at approximately the initial charge value.

3. Articulated Contacts:
With the gage in place and the front contacts in line, adjust the contacts so that they are just closed. In some cases, in order to get proper calibration values, a gage, different from that specified on the requirement table by plus or minus .001 in. may be used. With a gage .003 in. thicker, for size 2 relays, and .001 in. thicker, for other relays, than that used for this adjustment, the front contacts must be open.

4. Non-articulated Contacts:
With the gage in place, adjust the front contacts so that they are in line and light is barely perceptible between the contact surfaces. In some cases, in order to get proper calibration values, it may be necessary to use a thinner gage but it should not be thinner than the minimum specified on the requirement table. With a gage .001 in. thinner than that used for this adjustment, the front contacts must be closed.

(c) Polar contact compression should be obtained by placing a gage between the polar armature stop pin or pins and the stop, of thickness specified in the compression column on the requirement table and adjust the normal and reverse contacts in the same manner as for the neutral contacts.

44 Contact Pressure:

(a) Pressure is the force exerted by the contact finger against the surface of the contact when the relay is energized at its working value. The amount of pressure is that force, applied in line with the point of contact, required to just open the contact.

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1. Articulated Contact:

With the relay energized at its initial charge value, each contact should remain closed when the pressure as specified in the pressure column on the requirement table is applied to the contact finger in back of and against the contact and shall open when the same pressure is applied to the contact finger in front of and against the contact.

2. Non-articulated Contact:

With the relay energized at its initial charge value, the contact pressure should be approximately that specified in the pressure column on the requirement table.

45 Contact Opening:

(a) Neutral back contact opening between finger contact and back contact with the front contact just closed, is the minimum back contact opening and shall be as specified on the requirement table.

(b) Neutral front contact opening is the opening between the contact finger and the front contact with the armature fully released and shall be as specified on the requirement table.

(c) Polar Contact Opening:

1. Normal and reverse polar contact opening is the opening between the contact finger and the normal or reverse polar contact with the polar armature fully in opposite position and shall be as specified on the requirement table.

2. With either normal or reverse contacts just closed, the contact opening in the opposite position shall be not less than .020 inch.

46 The initial cleaned contact resistance when relay is energized at its working value, must not exceed the following:

KIND OF CONTACT	OHMS PER CONTACT
Silver to Silver	.03
Silver Gauze to Carbon	.13
Silver to Carbon	.18
Silver to Silver Impregnated Carbon	.09
Carbon to Carbon	.40
Silver Impregnated Carbon to Silver Impregnated Carbon	.20

47 Tests as required by Form SC-8 or SC-12 must be made and recorded at the time relay is tested.

48 Pick-up and drop-away tests must also be made with armature moved to take up end play in each direction to determine if this causes excess friction. Values so obtained must be in accordance with operating values as shown on the requirement table.

49 Inspect all nuts to determine that they are tight and then bend lock washers into place.

50 Before case is closed, relay and case must be cleaned to remove any foreign matter, then check to see that all parts are in proper position and in good condition.

51 Defective gaskets must be replaced.

52 Pasters in accordance with Plan 08 shall be properly filled out and placed in the relay enclosure in a location where it cannot interfere with the operation of the relay or obstruct the view of the working parts and can be readily seen with relay in its operating position.

53 Relay case must be sealed with a seal that can be identified. Seal shall be applied so that the cover cannot be loosened or removed without breaking the seal.

54 Final pick-up, drop-away and working current or voltage tests must be made after relay is sealed. The values obtained must not vary more than 2 per cent from those of the previous tests.

55 Tag showing requirement table number for the relay must be fastened to the relay in approved manner.

FIELD

56 Paragraphs 20 to 30 inclusive shall apply.

57 Tests as required by Para. 30 and Form SC-12 must be made at least once every 2 years.

58 Before commencing pick-up and drop-away test, remove only positive wire from binding post of relay to insure that test current flows through relay in same direction as normal service current and complete test as required by Para. 30.

59 Relays not meeting field requirements must be taken from service as promptly as possible.

60 When relays are placed in service, the operating values must not differ from the manufacture values by more than 50 per cent of the difference between the manufacture and field values as specified on the requirement tables. In an emergency, relays meeting field values may be used.

61 Determine by observation that sufficient front, back and polar contact opening exists.

62 Check all nuts and terminal posts to determine that they are tight and that case is properly applied and sealed.

63 Parts enclosed must be free from foreign matter, in proper position and in good condition.

64 In emergency, repairs and adjustments to insure proper operation of relay may be made in the field only by authorized persons.

RECORDS

65 Office relay records should be filed in groups, indexed according to location in the order of mileage direction.

66 Relay records of an interlocking should be filed under index card for that location.

67 Relay records of automatic signal territory should be indexed for the territory between points designated.

68 Relays must be identified by Serial number which must be recorded. Manufacturer's serial number must be used if available, otherwise a number will be assigned by proper authority.

69 Inspectors must record periodic field readings on Form SC-8 or SC-12 which must be forwarded to office designated.

70 When readings are transferred from Form SC-12 to Form SC-8, 1 Form SC-8 must be used for each relay.

71 Record of removal and replacement of relays shall be made on Form SC-11 and forwarded to designated office.

OHMS	CONTACTS								NEUTRAL ORDINARY ACTING				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.& S.Co., Reference	Table No.	
.051	2						Standard	.050	53000-124 Gr 2	1A			
.08	2						"	.050			C-9432-22 Pc 224396	1C	
.08	4						"	.050			C-9077-104 Pc 104944	1D	
.10	2						"	.050	53000-124 Gr 7	2A			
.74	2						"	.050			C-9432-17 Pc 222649	2H	
2	2						"	.050	53000-122 Gr 2	5A	C-9432-24 Pc 224088	5B	
4	2						"	.050	53000-122 Gr 4	15	C-9432-24 Pc 224089	18B	
4	2						"	.050	53000-116 Gr 6	16	C-9432-3 Pc 212877	17	Pri.Relay of Pri.-Sec. Comb'n.
4	4						"	.050	53000-84 Gr 3	24	C-9077-24 Pc 150956	25	
4	4						"	.050	53000-190 Gr 3	26A	C-9077-24 Pc 150956	26B	Plug Coupled.
4	6						"	.050	53000-96 Gr 3	32A	C-9077-15 Pc 142676	33	
10.8	4						"	.050	53000-190 Gr 25	50C			Plug Coupled.
16	4						"	.050	53000-84 Gr 5	57	C-9077-56 Pc 163574	59	
16	4						"	.050	53000-190 Gr 5	58	C-9077-56 Pc 163574	61	Plug Coupled.
50	2						"	.050	53000-122 Gr 11	67			
55	2						"	.050			C-9432-17 Pc 223421	68	
55	4						"	.050			C-9077-103 Pc 213536	69	
100	4						"	.050	53000-84 Gr 7	71A	C-9077-56 Pc 161997	73A	
100	4						"	.050	53000-190 Gr 7	72B	C-9077-56 Pc 161997	73B	Plug Coupled.
200	4						"	.050	53000-84 Gr 9	81	C-9077	82A	
200	4						"	.050	53000-190 Gr 9	80	C-9077	82B	Plug Coupled.
200	8						"	.090	53000-108 Gr 10A	86			
280			1	1			Special	.035			B-12671-11 Pc 191928	90	
450	4						Standard	.050	53000-84 Gr 13	101A			
500	2						"	.050	53000-122 Gr 18	107	C-9432-24 Pc 224101	108B	
500	4						"	.050	53000-84 Gr 14	113B	C-9077-24 Pc 157285	112A	
500	4						"	.050	53000-190 Gr 14	113C	C-9077-24 Pc 157285	112B	Plug Coupled.
500	4						"	.090	53000-84 Gr 14A	115	C-9077-56 Pc 164565	117	
670	4						"	.050	53000-84 Gr 16	135A	C-9077-24 Pc 157282	136A	
670	4						"	.050	53000-190 Gr 16	135C	C-9077-24 Pc 157282	136B	Plug Coupled.
670	4						H.D.	.090	53000-199 Gr 16	135G			
670	4						H.D.	.050	53000-207 Gr 16	135D			Plug Coupled.
670	4						E.H.D.	.125	53000-157 Gr 16	135E			
670	4						Special				C-9077-56 Pc 184860	136C	
670	6						Standard	.050	53000-96 Gr 16	141	C-9077-15 Pc 159864	142	

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

390B

7-15-1944

D. C. RELAYS

PURCHASE LIST — TRACTIVE ARMATURE TYPE

Plan redrawn and renumbered 6510 (4-24-40) was old 2660 Issue: 1 of 2-19-1935 canceled

Revd. 3-8-41, renumbered 255 (was 6510 [illegible]ed)

NOTE: Where other arresters than those shown are to be used the Signal Engineer's approval must be obtained.

USE	ITEM	MANUFACTURER	ORDERING REFERENCE
FOR PROTECTION OF SIGNAL LAMP BULBS Not to exceed 20 volts	1	Fansteel Metallurgical Corp.	Type L-3 or equal
	2	Western Railroad Supply Co.	Type 275-TC or equal
	3		
FOR SIGNAL CONTROL CIRCUITS Not to exceed 250 volts	4	Railroad Accessories Corp.	Everett Multipath Type-W No.800 or equal
	5	Railroad Accessories Corp.	Everett Multipath Type-E No.801 or equal
Across track relay coils or track wires	6	Railroad Accessories Corp.	Raco No.560 Type-B or equal (Hystatic shunt)
	7		
FOR SIGNAL POWER TRANSMISSION LINES 110 to 750 volts located on Western Union Teleg. Co. Lines (either above or below W. U. T. Co. wires).	8	General Electric Co.	No. 9LA10A202 or equal (Single pole-Pellet type)
	9	General Electric Co.	No. 9LA10A204 or equal (Double pole-Pellet type)
	10		
FOR SIGNAL POWER TRANSMISSION LINES 750 to 9000 volts	11	Westinghouse Electric & Mfg. Co.	Type-S No. 1105474 or equal (Autovalve) Cap'y 6000 volts
	12	□ General Electric Co.	No. 9LA10A4 (Pellet type) Min. 3000 - Max. 6000 volts
	13	△ General Electric Co.	No. 9LA10A5 (Pellet type) Min. 6000 - Max. 9000 volts
	14		

MAXIMUM CAPACITY

	Ungrounded neutral	Grounded neutral
□	=6000 volts	9000 volts
△	=9000 volts	12800 volts

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

LIGHTNING ARRESTERS

ORDERING REFERENCES AND INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

255

1 | 3-8-1941

Approved by Representatives of Lines shown.

Chairman

Price Dept

New York Central System
Standard Plans

Recd with letter of
Feb 8-1945

Cancells entire previous
#390 issue of 4-30-41

T J Quinn

OHMS	CONTACTS								NEUTRAL—OTHER THAN ORDINARY ACTING				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.&S.Co., Reference	Table No.	
NEUTRAL SLOW RELEASE													
38	4						Standard	.050	53000-103 Gr 6	169A			
38	4						Standard	.050	53000-185 Gr 50	169B			Plug coupled.
38	4						Standard	.050	53000-190 Gr 50	169C			Plug coupled.
50	4						Standard	.050	53000-185 Gr 49	170A			
100	2						Standard	.050			C9432-17 Pc 223422	171	
100	4						Standard	.050	53000-84 Gr 30	172A	C9077-24 Pc 157289	174A	
100	4						Standard	.050			C9077-112 Pc 217234	174B	~~Plug coupled.~~
100	4						Standard	.050	53000-190 Gr 30	176	C9077-24 Pc 157289	174C	Plug coupled
152	4						Standard	.050	53000-84 Gr 44	180	C9077	181	
200	4						Standard	.050	53000-85 Gr 37	187	C9077	189	
250	6						Standard	.050			C9077-15 Pc 168245	196	
400	4						Standard	.050	53000-84 Gr 50	203	C9077-24 Pc 157284	204	
400	4						Standard	.050	53000-175 Gr 6	212			Plug coupled.
400	4						Standard	.050	53000-190 Gr 50	213	C9077-24 Pc 157284	214	Plug coupled.
400	6						Standard	.050	53000-96 Gr 37	218	C9077-15 Pc 159553	219	
450	6						H. D.	.125	53000-133 Gr 77B	224			
500	4						Standard	.050	53000-181 Gr 2	229	C9077-24 Pc 157188	227	Plug coupled.
500	4						Standard	.050			C9077-24 Pc 157188	228	
NEUTRAL SLOW PICK-UP													
580	4						Standard	.050	53000-113 Gr 5	255			
580	6						Standard	.050	53000-114 Gr 5	260			
880	6						Standard	.050	53000-119 Gr 6	265			Sec. relay of Pri-Sec. Comb'n.
NEUTRAL SLOW PICK-UP AND SLOW RELEASE													
64	4						Standard	.050			C9077-101 Pc 217453	273	
64	6						Standard	.050			C9077-101 Pc 217454	274	
350	4						Standard	.050	53000-85 Gr 78	275	C9077-74 Pc 172634	276	
NEUTRAL QUICK SHUNT								.050-US&SCo					
2	2						Standard	.040	53000-172 Gr 2	277A	C9432-24 Pc 224111	277B	
							Standard	.040	53000-172 Gr 2	277A			

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

390B

7-15-1944

D. C. RELAYS

PURCHASE LIST—TRACTIVE ARMATURE TYPE

OHMS	CONTACTS								NEUTRAL—OTHER THAN ORDINARY ACTING				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.& S.Co., Reference	Table No.	
NEUTRAL COMPOUND													
28-.04	4						Standard	.090	53000-85 Gr 29	306			
140-140	2						Standard	.050	53000-85 Gr 71	307			
500-.108	2						Standard	.050	53000-185 Gr 98	308			
250-.04	4						Standard	.090	53000-85 Gr 46	309			
NEUTRAL POWER TRANSFER													
18	2						S - S	Special	53000-185 Gr 14	352			
75-75	2						Standard	.090			C9432-20 Pc 223526	354	
75-75	4						Standard	.090			C9077-109 Pc 220131	356	
132-132	2						S - S	.050	53000-123 Gr 4	360			
200	8						H. D.	.090	53000-85 Gr 28	365			
NEUTRAL OVERLOAD													
5				1			S - S	.040			B12739-2 Pc 195969	370	
5-65	1			1			S - S	.040			B12739-2 Pc 192910	371	
5				1			S - S	.040			B12739-2 Pc 213453	372	
5-65	1			1			S - S	.040			B12739-2 Pc 213454	373	
200-.053	2						S - S	.050	53000-85 Gr 96	375			
250-.053	2						S - S	.050	53000-185 Gr 43	376			
400-.053	2						S - S	.050	53000-85 Gr 89	380			
1850-.053	2						S - S	.050	53000-185 Gr 30	384			
NEUTRAL APPROACH LIGHT													
11	1						Standard	.040	53000-185 Gr 28	408			
INTERLOCKING								.072"-US&SCo					
4 x 4	8						Standard	.032	53003-20 Gr 3	456	C9242-3 Pc 155293	454	
4 x 4	8						H. D.	.032	53003-46 Gr 2	458	C-9242-5 Pc 215683	453	
4 x 500	8						H. D.	.032	53003-46 Gr 7	470D	C-9242-5 Pc 215682	470F	
500 x 500	8						Standard	.032	53003-20 Gr 15	472A	C9242-3 Pc 158831	471	
500 x 500	8						H. D.	.032	53003-46 Gr 3	474	C-9242	475	
FLASHER													
185 x 185	4						SP.	Adj.	53004-34 Gr 5	488B			
260 x 260	4						SP.	Adj.	53004-34 Gr 6	495B			
400 x 400	4						SP.	Adj.	53004-34 Gr 7	508B			
500 x 500		4					S.	.054			C9357-6 Pc 104134	516	

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

D.C. RELAYS

PURCHASE LIST—TRACTIVE ARMATURE TYPE

390B

7-15-1944

OHMS	CONTACTS								POLARIZED				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.& S.Co., Reference	Table No.	
									POLARIZED ORDINARY ACTING				
4	4	2					Standard	.050	53002-123 Gr 3	545A	C9270-4 Pc 159902	544	
200	4	4					Standard	.050	53002-112 Gr 9	586A	C9270	588	
200	4	4					Standard	.090	53002-112 Gr 9A	586B			
200		4	4				Standard	.050	53002-111 Gr 9	587A			
200		4	4				Standard	.090	53002-111 Gr 9A	587B			
450	4	4					Standard	.050	53002-112 Gr 13	590			
670	4	2					Standard	.050			C9270-4 Pc 159544	611	
670	4	4					Standard	.050	53002-112 Gr 14	615	C9270-6 Pc 163685	616	
									POLARIZED SLOW RELEASE				
100	4	4					Standard.	.050	53002-112 Gr 75	651			
200	4	4					Standard	.050	53002-112 Gr 76	655			
290	4	4					Standard	.050	53002-112 Gr 52	657			
400	4	4					Standard	.050	53002-112 Gr 53	661	C9270	662	
									POLARIZED—RETAINED NEUTRAL				
200	4	4					Standard	.050	53002-131 Gr 3	668			
250	4	4					Standard	.050			C9407-7 Pc 194313	669	
400	4	4					Standard	.050			C9407-7 Pc 228105	670	
480	4	4					Standard	.050	53002-117 Gr 2	671			
670	4	4					Standard	.050			C9407-7 Pc 213977	672	
									POLARIZED COMPOUND				
250 - 250	4	4					Standard	.080			C9363-1 Pc 191149	674	
									POLARIZED—SWITCH CONTROL				
280	2	4	1				Standard*	.050			C9270-32 Pc 232930	634	
1000	2	4	1				Standard*	.050			C9270-32 Pc 232933	635	
							*One Magnetic Blow out.						

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
PURCHASE LIST—TRACTIVE ARMATURE TYPE
390B
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	Normal	Reverse
Initial charge	V	.102	.102		
	A	2.00	2.00		
Min. drop-away without contact pressure	V	.020			
	A	.400			
Min. drop-away	V	.033	.051		
	A	.650	1.00		
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.051	See		
	A	1.00	Remarks		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-128&78 Pg4
Remarks: With rectifier. Dwg.no.54728-14 Gr 1
On 60 cycle A.C. relay must be quiet on 1.5
amperes or more.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-124	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.051 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 1A

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	Normal	Reverse
Initial charge	V	1.10	1.10		
	A	1.60	1.60		
Min. drop-away without contact pressure	V	.022			
	A	.320			
Min. drop-away	V	.036	.048		
	A	.520	.700		
Min. pick-up	V	.046			
	A	.666			
Max. pick-up	V				
	A				
Max. working	V	.055	See		
	A	.800	Remarks		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-128&78 Pg4
Remarks: With rectifier.
On 60 cycle A.C. relay must be quiet on 1.2
amperes or more.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-124	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.069 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 1B

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	Normal	Reverse
Initial charge	V	.144			
	A	1.80			
Min. drop-away without contact pressure	V	.0092			
	A	.116			
Min. drop-away	V	.0163	.310		
	A	.204	.320		
Min. pick-up	V				
	A				
Max. pick-up	V	.0324	.386		
	A	.405	.470		
Max. working	V	.0324	.386		
	A	.405	.470		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666E
Remarks: Minimum compression .032 inch.
Relay has half wave rectifier connected
across coils. Do not reverse polarity
when testing on D.C.
To test on A.C. connect 5.5 ohm resistance
in series.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22L	2	C-9432-22	224396

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.08 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 1C

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 390B
D. C. RELAYS
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	D.C.	
Initial charge	V	.096			
	A	1.20			
Min. drop-away without contact pressure	V	.0092			
	A	.115			
Min. drop-away	V	.023	.350	.016	
	A	.290	.400	.203	
Min. pick-up	V				
	A				
Max. pick-up	V	.043	.450		
	A	.535	.620		
Max. working	V	.046	.470	.0506	
	A	.575	.670	.6327	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.031 in.	2 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.050 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444G
Remarks: Minimum compression .027 inch.
Do not reverse polarity on D.C.
Use 5.5 ohm resistance in series for A.C.
test.
Relay has half wave rectifier connected
across coils.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11L	4	C-9077-104	104944

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.08 ohms	F	B	N	R
	ohms				
	ohms	4 FB		NR	

DATE 7-15-1944 TABLE NO. 1D

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	Normal	Reverse
Initial charge	V	.100	.100		
	A	1.00	1.00		
Min. drop-away without contact pressure	V	.020			
	A	.200			
Min. drop-away	V	.033	.038		
	A	.325	.380		
Min. pick-up	V	.042			
	A	.417			
Max. pick-up	V				
	A				
Max. working	V	.050	See		
	A	.500	Remarks		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	S	to	S	.029 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-128&78 Pg4
Remarks: With rectifier. Dwg. no. 54728-14 Gr 1
On 25 cycle A.C. relay must be quiet on .74
amperes or more.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-124	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.10 ohms	F	B	N	R
	ohms				
	ohms	2 FB		NR	

DATE 7-15-1944 TABLE NO. 2A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		D.C.	A.C.	Normal	Reverse
Initial charge	V	.388			
	A	2.10			
Min. drop-away without contact pressure	V	.0136			
	A	.0752			
Min. drop-away	V	.024	.365	.017	
	A	.132	.200	.0924	
Min. pick-up	V				
	A				
Max. pick-up	V	.0486			
	A	.263			
Max. working	V	.0486	.475	.535	
	A	.263	.300	.289	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.033 in.	1.4 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666E
Remarks: Minimum compression .032 inch.
Do not reverse polarity on D.C.
Use 5.5 ohm resistance in series for A.C.
test.
Relay has half wave rectifier connected
across coils.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22L	2	C-9432-22	223430

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.185 ohms	F	B	N	R
	ohms				
	ohms	2 FB		NR	

DATE 7-15-1944 TABLE NO. 2B

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 390B
D. C. RELAYS
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.372			
	A	.500			
Min. drop-away without contact pressure	V	.0277			
	A	.0375			
Min. drop-away	V	.0462		.0324	
	A	.0625		.0438	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.093		.102	
	A	.125		.138	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .017 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.025 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2685
Remarks: Minimum compression- .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22C	2	C-9432-17	222649

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	.74 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 2H

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.836		.836	
	A	.440		.440	
Min. drop-away without contact pressure	V	.040			
	A	.021			
Min. drop-away	V	.0988		.0722	
	A	.052		.038	
Min. pick-up	V				
	A				
Max. pick-up	V	.209	.262		
	A	.110	.138		
Max. working	V	.268		.295	
	A	.141		.155	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	H	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1.9 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 3A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.836		.836	
	A	.440		.440	
Min. drop-away without contact pressure	V	.040			
	A	.021			
Min. drop-away	V	.0988		.0722	
	A	.052		.038	
Min. pick-up	V				
	A				
Max. pick-up	V	.209	.262		
	A	.110	.138		
Max. working	V	.268		.295	
	A	.141		.155	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	J	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1.9 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 3B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.712		.712	
	A	.356		.356	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.134		.117	
	A	.067		.0586	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.178		.196	
	A	.089		.0979	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.024 in.	1.25 oz.	.040 in.
B S to S	XXXX	XXXX	.010 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-200
Remarks: Adjustable core.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-172	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 4

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.696		.696	
	A	.348		.348	
Min. drop-away without contact pressure	V	.058			
	A	.029			
Min. drop-away	V	.110		.0964	
	A	.055		.0482	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.174		.191	
	A	.087		.0957	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-122	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 5A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.744		.744	
	A	.372		.372	
Min. drop-away without contact pressure	V	.0604			
	A	.0302			
Min. drop-away	V	.106		.0928	
	A	.053		.0464	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.186		.205	
	A	.093		.1023	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224088

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 5B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.816		.816	
	A	.408		.408	
Min. drop-away without contact pressure	V	.058			
	A	.029			
Min. drop-away	V	.108		.0886	
	A	.054		.0443	
Min. pick-up	V	.174			
	A	.087			
Max. pick-up	V				
	A				
Max. working	V	.204		.224	
	A	.102		.112	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 6

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.816		.816	
	A	.408		.408	
Min. drop-away without contact pressure	V	.058			
	A	.029			
Min. drop-away	V	.108		.0886	
	A	.054		.0443	
Min. pick-up	V	.174			
	A	.087			
Max. pick-up	V				
	A				
Max. working	V	.204		.224	
	A	.102		.112	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 7

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.824		.824	
	A	.412		.412	
Min. drop-away without contact pressure	V	.044			
	A	.022			
Min. drop-away	V	.108		.0886	
	A	.054		.0443	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.206		.226	
	A	.103		.113	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	152232

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 8

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.904		.904	
	A	.452		.452	
Min. drop-away without contact pressure	V	.042			
	A	.021			
Min. drop-away	V	.049		.0686	
	A	.047		.0343	
Min. pick-up	V				
	A				
Max. pick-up	V	.226	.282	.248	
	A	.113	.141	.124	
Max. working	V	.346		.380	
	A	.173		.190	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	.050 in.
B ______ to ______	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 10

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.04		1.04	
	A	.260		.260	
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	.160		.140	
	A	.040		.035	
Min. pick-up	V	.240			
	A	.060			
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-122	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		2 FB		______ NR	

DATE 7-15-1944 TABLE NO. 15

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	1.02			
	A	.256			
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	.156	.200		
	A	.039	.050		
Min. pick-up	V	.160	.226		
	A	.040	.056		
Max. pick-up	V	.256			
	A	.064			
Max. working	V	.260	.268		
	A	.065	.067		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-129
Remarks: Primary relay of primary-secondary combination.
(1) Values using left and right terminals.
(2) Values using left hand and center terminals.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-116	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		2 FB		______ NR	

DATE 7-15-1944 TABLE NO. 16

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	.992		.992	
	A	.248		.248	
Min. drop-away without contact pressure	V	.113			
	A	.0284			
Min. drop-away	V		.200	.175	
	A		.050	.0437	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.248		.273	
	A	.062		.0682	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.0 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666F
Remarks: Minimum compression .032 inch.
Primary relay of primary-secondary combination.
(1) Connect S-1 to S-2.
(2) Connect S-1 to S-3.
Max Drop-Away- .244 Volt, .061 Amp.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-3	212877

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	2 F	1 B	N	R
	ohms		FB		NR
	ohms				

DATE 7-15-1944 TABLE NO. 17

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.04		1.04	
	A	.260		.260	
Min. drop-away without contact pressure	V	.084			
	A	.021			
Min. drop-away	V	.148		.130	
	A	.037		.0325	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-3	185126

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	ohms		2 FB		NR
	ohms				

DATE 7-15-1944 TABLE NO. 18A

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.04		1.04	
	A	.260		.260	
Min. drop-away without contact pressure	V	.084			
	A	.021			
Min. drop-away	V	.148		.130	
	A	.037		.0325	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224089

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	ohms		2 FB		NR
	ohms				

DATE 7-15-1944 TABLE NO. 18B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.240			
	A	.060			
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 22

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 23

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.240			
	A	.060			
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 24

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	150956

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 25

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 26A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Plug coupled.
Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	150956

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 26B

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.120		1.120	
	A	.280		.280	
Min. drop-away without contact pressure	V	.052			
	A	.013			
Min. drop-away	V	.120		.0876	
	A	.030		.0219	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.280		.308	
	A	.070		.077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	.015 in.	1.75 oz.	.050 in.
B ______ to ______	X X X X	X X X X	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Above values apply to all 4 ohm relays of this type not listed elsewhere in Instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 27

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SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.25		1.25	
	A	.312		.312	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.312	.392	.343	
	A	.078	.098	.0858	
Max. working	V	.480		.528	
	A	.120		.132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	X X X X	X X X X	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 13	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 28A

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.25		1.25	
	A	.312		.312	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.312	.392	.343	
	A	.078	.098	.0858	
Max. working	V	.480		.528	
	A	.120		.132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	X X X X	X X X X	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Hall J	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 28B

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.25		1.25	
	A	.312		.312	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.312	.392	.343	
	A	.078	.098	.0858	
Max. working	V	.480		.528	
	A	.120		.132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	H	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 28C

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.096			
	A	.024			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.300			
	A	.075			
Max. pick-up	V				
	A				
Max. working	V	.352		.387	
	A	.088		.0968	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 32A

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.096			
	A	.024			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.300			
	A	.075			
Max. pick-up	V				
	A				
Max. working	V	.352		.387	
	A	.088		.0968	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F G to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-94	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ______ ohms ______ ohms	2 F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 32B

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 390B
4-30-1941
7-15-1944
D. C. RELAYS

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.096			
	A	.024			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.300			
	A	.075			
Max. pick-up	V				
	A				
Max. working	V	.352		.387	
	A	.088		.0968	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-92	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 32C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.096			
	A	.024			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.300			
	A	.075			
Max. pick-up	V				
	A				
Max. working	V	.352		.387	
	A	.086		.0968	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-86	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 32D

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.18		1.18	
	A	.296		.296	
Min. drop-away without contact pressure	V	.0704			
	A	.0176			
Min. drop-away	V	.162		.133	
	A	.0405		.0332	
Min. pick-up	V				
	A				
Max. pick-up	V	.296			
	A	.074			
Max. working	V	.388		.427	
	A	.097		.1067	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	142676

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 33

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.38		1.38	
	A	.344		.344	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.344	.412	.378	
	A	.086	.103	.0946	
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 13	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	6 FB		___ NR	

DATE 7-15-1944 TABLE NO. 34A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.38		1.38	
	A	.344		.344	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.344	.412	.378	
	A	.086	.103	.0946	
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Hall J	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	6 FB		___ NR	

DATE 7-15-1944 TABLE NO. 34B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.38		1.38	
	A	.344		.344	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.344	.412	.378	
	A	.086	.103	.0946	
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	H	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	6 FB		___ NR	

DATE 7-15-1944 TABLE NO. 34C

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.180		.148	
	A	.045		.037	
Min. pick-up	V	.316			
	A	.079			
Max. pick-up	V	.352			
	A	.088			
Max. working	V	.440		.484	
	A	.110		.121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ___
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	8	C-9077-48	161945

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ohms ohms	F	B	N	R
		8 FB		NR	

DATE 7-15-1944 TABLE NO. 38A

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.41		1.41	
	A	.352		.352	
Min. drop-away without contact pressure	V	.080			
	A	.020			
Min. drop-away	V	.180		.148	
	A	.045		.037	
Min. pick-up	V	.316			
	A	.079			
Max. pick-up	V	.352			
	A	.088			
Max. working	V	.440		.484	
	A	.110		.121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ___
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	8	C-9077-48	155479

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ohms ohms	4 F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 38B

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.10		2.10	
	A	.300		.300	
Min. drop-away without contact pressure	V	.168			
	A	.024			
Min. drop-away	V	.301		.246	
	A	.043		.0352	
Min. pick-up	V	.455			
	A	.065			
Max. pick-up	V				
	A				
Max. working	V	.525		.577	
	A	.075		.0825	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time .65 sec. at .105 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 2
Remarks: One yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	7 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 45

SIGNAL AND TRAIN CONTROL COMMITTEE 390B
D. C. RELAYS
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.68		1.68	
	A	.240		.240	
Min. drop-away without contact pressure	V	.077			
	A	.011			
Min. drop-away	V	.189		.138	
	A	.027		.0197	
Min. pick-up	V				
	A				
Max. pick-up	V	.420	.525	.462	
	A	.060	.075	.066	
Max. working	V	.637		.700	
	A	.091		.100	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	7 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 46

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.09		2.09	
	A	.232		.232	
Min. drop-away without contact pressure	V	.099			
	A	.011			
Min. drop-away	V	.234		.171	
	A	.026		.019	
Min. pick-up	V				
	A				
Max. pick-up	V	.522	.657	.574	
	A	.058	.073	.0638	
Max. working	V	.810		.891	
	A	.090		.099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	9 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 49

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.64		1.64	
	A	.152		.152	
Min. drop-away without contact pressure	V	.121			
	A	.0112			
Min. drop-away	V	.224		.157	
	A	.0207		.0145	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.41		.452	
	A	.038		.0418	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	25

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	10.8 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 50A

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.64		1.64	
	A	.152		.152	
Min. drop-away without contact pressure	V	.121			
	A	.0112			
Min. drop-away	V	.224		.157	
	A	.0207		.0145	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.410		.451	
	A	.038		.0418	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	25

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	10.8 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 50B

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.64		1.64	
	A	.152		.152	
Min. drop-away without contact pressure	V	.121			
	A	.0112			
Min. drop-away	V	.224		.157	
	A	.0207		.0145	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.41		.451	
	A	.038		.0418	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	25

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	10.8 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 50C

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.94		1.94	
	A	.176		.176	
Min. drop-away without contact pressure	V	.143			
	A	.013			
Min. drop-away	V	.253		.208	
	A	.023		.0189	
Min. pick-up	V	.418			
	A	.038			
Max. pick-up	V				
	A				
Max. working	V	.484		.532	
	A	.044		.0484	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	11 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 51

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.11		2.11	
	A	.192		.192	
Min. drop-away without contact pressure	V	.088			
	A	.008			
Min. drop-away	V	.231		.168	
	A	.021		.0153	
Min. pick-up	V				
	A				
Max. pick-up	V	.528	.660	.581	
	A	.048	.060	.0528	
Max. working	V	.792		.871	
	A	.072		.0792	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	11 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-16-1944 TABLE NO. 52

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.45		2.45	
	A	.204		.204	
Min. drop-away without contact pressure	V	.108			
	A	.009			
Min. drop-away	V	.288		.210	
	A	.024		.0175	
Min. pick-up	V				
	A				
Max. pick-up	V	.612	.756	.673	
	A	.051	.063	.0561	
Max. working	V	.876		.960	
	A	.073		.080	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	12 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 55

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.31		2.31	
	A	.144		.144	
Min. drop-away without contact pressure	V	.160			
	A	.010			
Min. drop-away	V	.304		.250	
	A	.019		.0156	
Min. pick-up	V	.496			
	A	.031			
Max. pick-up	V				
	A				
Max. working	V	.576		.634	
	A	.036		.0396	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 56

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.31		2.31	
	A	.144		.144	
Min. drop-away without contact pressure	V	.160			
	A	.010			
Min. drop-away	V	.304		.250	
	A	.019		.0156	
Min. pick-up	V	.496			
	A	.031			
Max. pick-up	V				
	A				
Max. working	V	.576		.634	
	A	.036		.0396	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 57

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.31		2.31	
	A	.144		.144	
Min. drop-away without contact pressure	V	.160			
	A	.010			
Min. drop-away	V	.304		.250	
	A	.019		.0156	
Min. pick-up	V	.496			
	A	.031			
Max. pick-up	V				
	A				
Max. working	V	.576		.634	
	A	.038		.0396	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28 623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 58

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.16		2.16	
	A	.136		.136	
Min. drop-away without contact pressure	V	.117			
	A	.0073			
Min. drop-away	V	.288		.236	
	A	.018		.0148	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.544		.597	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	163574

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ____ ohms ____ ohms	~~4~~ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 59

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.88		2.88	
	A	.180		.180	
Min. drop-away without contact pressure	V	.128			
	A	.008			
Min. drop-away	V	.304		.224	
	A	.019		.014	
Min. pick-up	V				
	A				
Max. pick-up	V	.720	.880	.792	
	A	.045	.055	.0495	
Max. working	V	1.07		1.18	
	A	.067		.0737	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms	____ F	____ B	____ N	____ R
	____ ohms ____ ohms	4 FB		____ NR	

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TABLE NO. 60

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.16		2.16	
	A	.136		.136	
Min. drop-away without contact pressure	V	.117			
	A	.0073			
Min. drop-away	V	.288		.263	
	A	.018		.0148	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.544		.597	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Plug coupled.
Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	163574

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms	____ F	____ B	____ N	____ R
	____ ohms ____ ohms	4 FB		____ NR	

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TABLE NO. 61

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.68			
	A	.092			
Min. drop-away without contact pressure	V	.308			
	A	.0077			
Min. drop-away	V	.572		.400	
	A	.0143		.010	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.920		1.01	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-122	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	40 ohms	____ F	____ B	____ N	____ R
	____ ohms ____ ohms	2 FB		____ NR	

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TABLE NO. 65

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.68			
	A	.092			
Min. drop-away without contact pressure	V	.308			
	A	.0077			
Min. drop-away	V	.572		.400	
	A	.0143		.010	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.920		1.01	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks: Small terminal block.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-104	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	40 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 66

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.40			
	A	.088			
Min. drop-away without contact pressure	V	.370			
	A	.0074			
Min. drop-away	V	.690		.485	
	A	.0138		.0097	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.10		1.21	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-122	11

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	50 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.36			
	A	.0792			
Min. drop-away without contact pressure	V	.220			
	A	.0042			
Min. drop-away	V	.570		.402	
	A	.0104		.0073	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.09		1.20	
	A	.0198		.0218	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.060 in.	4 oz.	.050 in.
B S to S	XXXX	XXXX	.037 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .057 inch.
Maximum compression .065 inch.
Maximum drop-away .64 volts, .0117 amps.
Timing is ensured by adjustment of release valve with maximum and minimum limits.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22C	2	C-9432-17	223421

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	55 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 68

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.36			
	A	.0792			
Min. drop-away without contact pressure	V	.220			
	A	.0042			
Min. drop-away	V	.570		.402	
	A	.0104		.0073	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.09		1.20	
	A	.0198		.0218	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B 3 to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-103	213536

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	55 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 69

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V	1.50			
	A	.015			
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V	1.50			
	A	.015			
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 71B

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 72A

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V	1.50			
	A	.015			
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 72B

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.36			
	A	.0636			
Min. drop-away without contact pressure	V	.341			
	A	.0034			
Min. drop-away	V	.840		.588	
	A	.0084		.0059	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.59		1.75	
	A	.0159		.0175	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	161997

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 73A

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 72A

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.80			
	A	.068			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.900		.630	
	A	.009		.0063	
Min. pick-up	V	1.50			
	A	.015			
Max. pick-up	V				
	A				
Max. working	V	1.70		1.87	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 72B

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.36			
	A	.0636			
Min. drop-away without contact pressure	V	.341			
	A	.0034			
Min. drop-away	V	.840		.588	
	A	.0084		.0059	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.59		1.75	
	A	.0159		.0175	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	161997

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 73A

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.36			
	A	.0636			
Min. drop-away without contact pressure	V	.341			
	A	.0034			
Min. drop-away	V	.840		.588	
	A	.0084		.0058	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.59		1.75	
	A	.0159		.0175	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Plug coupled.
Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	161997

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	____ F	____ B	____ N	____ R
	______ ohms	4 FB		____ NR	
	______ ohms				

DATE 7-15-1944 TABLE NO. 73B

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	8.00			
	A	.080			
Min. drop-away without contact pressure	V	.350			
	A	.0035			
Min. drop-away	V	.850		.600	
	A	.0085		.006	
Min. pick-up	V				
	A				
Max. pick-up	V	2.0	2.50	2.20	
	A	.020	.025	.022	
Max. working	V	2.80		3.08	
	A	.028		.0308	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	____ F	____ B	____ N	____ R
	______ ohms	4 FB		____ NR	
	______ ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.60			
	A	.076			
Min. drop-away without contact pressure	V	.300			
	A	.003			
Min. drop-away	V	.700		.490	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V	1.90	2.40	2.09	
	A	.019	.024	.0209	
Max. working	V	1.90		2.09	
	A	.019		.0209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	.015 in.	1.75 oz.	.050 in.
B ______ to ______	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Above values apply to all 100 ohm relays of this type not listed elsewhere in instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	____ F	____ B	____ N	____ R
	______ ohms	4 FB		____ NR	
	______ ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.70			
	A	.104			
Min. drop-away without contact pressure	V	.405			
	A	.0036			
Min. drop-away	V	1.04		.728	
	A	.0092		.0065	
Min. pick-up	V				
	A				
Max. pick-up	V	2.93		3.22	
	A	.0262		.0288	
Max. working	V	3.83		4.21	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	.050 in.
B ______ to ______	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	112½ ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

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NYGS
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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.0			
	A	.088			
Min. drop-away without contact pressure	V	.325			
	A	.0026			
Min. drop-away	V	.950		.665	
	A	.0076		.0053	
Min. pick-up	V				
	A				
Max. pick-up	V	2.75		3.03	
	A	.022		.0242	
Max. working	V	3.75		4.12	
	A	.030		.033	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.048			
Min. drop-away without contact pressure	V	.600			
	A	.003			
Min. drop-away	V	1.20		.840	
	A	.006		.0042	
Min. pick-up	V	2.00			
	A	.010			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	9

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	200 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.048			
Min. drop-away without contact pressure	V	.600			
	A	.003			
Min. drop-away	V	1.20		.840	
	A	.006		.0042	
Min. pick-up	V	2.00			
	A	.010			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	9

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	200 ohms	___ F ___ B	___ N ___ R
	___ ohms		
	___ ohms	4 FB	___ NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.048			
Min. drop-away without contact pressure	V	.520			
	A	.0026			
Min. drop-away	V	1.26		.882	
	A	.0063		.0044	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ___
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	200 ohms	___ F ___ B	___ N ___ R
	___ ohms		
	___ ohms	4 FB	___ NR

DATE 7-15-1944 TABLE NO. 82A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.048			
Min. drop-away without contact pressure	V	.520			
	A	.0026			
Min. drop-away	V	1.26		.882	
	A	.0063		.0044	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ___
Remarks: Plug coupled.
Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	200 ohms	___ F ___ B	___ N ___ R
	___ ohms		
	___ ohms	4 FB	___ NR

DATE 7-15-1944 TABLE NO. 82B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	11.20			
	A	.056			
Min. drop-away without contact pressure	V	.500			
	A	.0025			
Min. drop-away	V	1.20		.840	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	2.80	3.40	3.08	
	A	.014	.017	.0154	
Max. working	V	4.20		4.62	
	A	.021		.0231	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	200 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

DATE 7-15-1944 TABLE NO. 83

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	12.96			
	A	.0648			
Min. drop-away without contact pressure	V	1.10			
	A	.0055			
Min. drop-away	V	1.50		1.06	
	A	.0075		.0053	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.24		3.56	
	A	.0162		.0178	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-9
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53000-108	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	200 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 8 FB ____ NR

DATE 7-15-1944 TABLE NO. 84

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	13.0			
	A	.055			
Min. drop-away without contact pressure	V	1.10			
	A	.0055			
Min. drop-away	V	1.50		1.06	
	A	.0075		.0053	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.24		3.56	
	A	.0162		.0178	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-9
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53000-108	10A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	200 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 8 FB ____ NR

DATE 7-15-1944 TABLE NO. 86

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.80			
	A	.0519			
Min. drop-away without contact pressure	V	.500			
	A	.0024			
Min. drop-away	V	1.25		.875	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	2.70	3.33	2.97	
	A	.013	.016	.0143	
Max. working	V	3.84		4.00	
	A	.0175		.0192	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	208 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 88

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	20.40			
	A	.0728			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.21		.847	
	A	.0043		.003	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.10		5.50	
	A	.0182		.020	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.025 in.	1.0 oz.	.035 in.
B S to S	XXXX	XXXX	.010 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 2597 Indiv. ______
Remarks: Compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	L-10	2	B-12671-11	191928

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	280 ohms ______ ohms ______ ohms	1 F	1 B	______ N	______ R
		______ FB		______ NR	

DATE 7-15-1944 TABLE NO. 90

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	14.40			
	A	.036			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.00		1.40	
	A	.005		.0035	
Min. pick-up	V	3.20			
	A	.008			
Max. pick-up	V				
	A				
Max. working	V	3.60		3.96	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	12

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	400 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 93A

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.036			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.00		1.40	
	A	.005		.0035	
Min. pick-up	V	3.20			
	A	.008			
Max. pick-up	V				
	A				
Max. working	V	3.60		3.96	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	12

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	400 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 93B

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.20			
	A	.048			
Min. drop-away without contact pressure	V	1.240			
	A	.0031			
Min. drop-away	V	2.32		1.68	
	A	.0058		.0042	
Min. pick-up	V	4.12			
	A	.0103			
Max. pick-up	V				
	A				
Max. working	V	4.60		5.28	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	12

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	400 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 7-15-1944 TABLE NO. 96

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.13			
	A	.0025			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V	3.15			
	A	.007			
Max. pick-up	V				
	A				
Max. working	V	4.05		4.45	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4	53000-84	13

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	450 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 101A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.13			
	A	.0025			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V	3.15			
	A	.007			
Max. pick-up	V				
	A				
Max. working	V	4.05		4.45	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	13

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	450 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB			______ NR

DATE 7-15-1944 TABLE NO. 101B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.13			
	A	.0025			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V	3.15			
	A	.007			
Max. pick-up	V				
	A				
Max. working	V	4.05		4.45	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	13A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	450 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB			______ NR

DATE 7-15-1944 TABLE NO. 101C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.40			
	A	.052			
Min. drop-away without contact pressure	V	.810			
	A	.0018			
Min. drop-away	V	2.07		1.45	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V	5.85	7.20	6.44	
	A	.013	.016	.0143	
Max. working	V	7.65		6.42	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	450 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB			______ NR

DATE 7-15-1944 TABLE NO. 102

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.00			
	A	.034			
Min. drop-away without contact pressure	V	1.45			
	A	.0029			
Min. drop-away	V	2.70		1.90	
	A	.0054		.0038	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.25		4.70	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks: Small terminal block.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	2	53000-104	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 7-15-1944 TABLE NO. 106

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.00			
	A	.034			
Min. drop-away without contact pressure	V	1.50			
	A	.003			
Min. drop-away	V	2.65		1.85	
	A	.0053		.0037	
Min. pick-up	V	3.90			
	A	.0078			
Max. pick-up	V				
	A				
Max. working	V	4.25		4.70	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	2	53000-122	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 7-15-1944 TABLE NO. 107

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	12.40			
	A	.0248			
Min. drop-away without contact pressure	V	1.0			
	A	.002			
Min. drop-away	V	1.76		1.25	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.09		3.40	
	A	.0062		.0068	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ___
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U. S. & S. Co.	DN-22	2	C-9432-3	195942

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 7-15-1944 TABLE NO. 108A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	12.36			
	A	.0247			
Min. drop-away without contact pressure	V	1.00			
	A	.002			
Min. drop-away	V	1.76		1.23	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.09		3.40	
	A	.0062		.0068	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224101

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	2 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 108B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-60	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 109

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.

Magnetic structure: ____

KIND	RESISTANCE	CONTACTS			
	____ ohms	____ F	____ B	____ N	____ R
	____ ohms	____ FB		____ NR	
	____ ohms				

DATE ____ TABLE NO. ____

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	5.50			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 110B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.40			
	A	.0348			
Min. drop-away without contact pressure	V	1.20			
	A	.0024			
Min. drop-away	V	2.25		1.60	
	A	.0045		.0032	
Min. pick-up	V	3.70			
	A	.0074			
Max. pick-up	V				
	A				
Max. working	V	4.35		4.80	
	A	.0087		.0096	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	15

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 111A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.40			
	A	.0348			
Min. drop-away without contact pressure	V	1.20			
	A	.0024			
Min. drop-away	V	2.25		1.60	
	A	.0045		.0032	
Min. pick-up	V	3.70			
	A	.0074			
Max. pick-up	V				
	A				
Max. working	V	4.35		4.80	
	A	.0087		.0096	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	19

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 111B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	14.00			
	A	.028			
Min. drop-away without contact pressure	V	.750			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.50		3.85	
	A	.007		.0077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157285

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

DATE 7-15-1944 TABLE NO. 112A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	14.00			
	A	.028			
Min. drop-away without contact pressure	V	.750			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.50		3.85	
	A	.007		.0077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.
Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157285

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

DATE 7-15-1944 TABLE NO. 112B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	5.50			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

DATE 7-15-1944 TABLE NO. 113A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	5.50			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.015 in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 113B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	5.50			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.015 in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 113C

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.80			
	A	.0376			
Min. drop-away without contact pressure	V	1.20			
	A	.0024			
Min. drop-away	V	2.25		1.60	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.70		5.15	
	A	.0094		.0103	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.015 in.	1.75 oz.	.090 in.
B	S to	S	XXXX	XXXX	.060 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	15A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 114

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

D.C. RELAYS

4-30-1941
7-15-1944

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	28.00			
	A	.056			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	2.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	6.00			
	A	.012			
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	14A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 115

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.72			
	A	.0374			
Min. drop-away without contact pressure	V	.750			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.68		5.15	
	A	.0094		.0103	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to SIC	.031 in.	2 oz.	.125 in.
B SIC to SIC	XXXX	XXXX	.125 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 1.5 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444B
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	164565

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 117

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.0504			
Min. drop-away without contact pressure	V	1.150			
	A	.0023			
Min. drop-away	V	2.65		1.85	
	A	.0053		.0037	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30	7.85	6.95	
	A	.0126	.0157	.0139	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	.015 in.	1.75 oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: Above values apply to all 500 ohm relays of this type not listed elsewhere in Instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 119

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	27.00			
	A	.054			
Min. drop-away without contact pressure	V	.900			
	A	.0018			
Min. drop-away	V	2.250		1.60	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.75		7.40	
	A	.0135		.0148	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: 5400 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 120

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	27.00			
	A	.054			
Min. drop-away without contact pressure	V	.900			
	A	.0018			
Min. drop-away	V	2.250		1.60	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.75		7.40	
	A	.0135		.0148	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: 5400 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 121

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.60			
	A	.0372			
Min. drop-away without contact pressure	V	.620			
	A	.0012			
Min. drop-away	V	1.55		1.10	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.65		5.10	
	A	.0093		.0102	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: 7850 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 122

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.60			
	A	.0372			
Min. drop-away without contact pressure	V	.600			
	A	.0012			
Min. drop-away	V	1.55		1.10	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.65		5.10	
	A	.0093		.0102	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: 7850 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	______ F	______ B	______ N	______ R
	______ ohms				
	______ ohms	4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 123

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.00			
	A	.044			
Min. drop-away without contact pressure	V	.650			
	A	.0013			
Min. drop-away	V	1.80		1.26	
	A	.0036		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	5.50	7.00		
	A	.011	.014		
Max. working	V	7.50		8.25	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	______ F	______ B	______ N	______ R
	______ ohms				
	______ ohms	4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 124

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.40			
	A	.0608			
Min. drop-away without contact pressure	V	1.150			
	A	.0023			
Min. drop-away	V	2.65		1.85	
	A	.0053		.0037	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.60		8.35	
	A	.0152		.0167	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	.015 in.	1.75 oz.	.090 in.
B ______ to ______	XXXX	XXXX	.060 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: 5400 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	______ F	______ B	______ N	______ R
	______ ohms				
	______ ohms	4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 127

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.40			
	A	.0448			
Min. drop-away without contact pressure	V	.600			
	A	.0012			
Min. drop-away	V	1.55		1.10	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.60		6.15	
	A	.0112		.0123	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: 7850 turn coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 128

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.80			
	A	.0296			
Min. drop-away without contact pressure	V	.900			
	A	.0018			
Min. drop-away	V	2.05		1.44	
	A	.0041		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V	3.70			
	A	.0074			
Max. working	V	4.85		5.34	
	A	.0097		.0107	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U. S. & S. Co.	DN-11	6	C-9077-15	159871

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	6 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 129

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	31.00			
	A	.062			
Min. drop-away without contact pressure	V	2.15			
	A	.0043			
Min. drop-away	V	3.95		2.75	
	A	.0079		.0055	
Min. pick-up	V	6.50			
	A	.013			
Max. pick-up	V				
	A				
Max. working	V	7.75		8.50	
	A	.0155		.017	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	6	53000-96	15

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms	6 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 130A

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

D. C. RELAYS

390B
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	31.00			
	A	.062			
Min. drop-away without contact pressure	V	2.15			
	A	.0043			
Min. drop-away	V	3.95		2.75	
	A	.0079		.0055	
Min. pick-up	V	6.50			
	A	.013			
Max. pick-up	V				
	A				
Max. working	V	7.75		8.50	
	A	.0155		.017	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.015 in.	1.75 oz.	.090 in.
B S	to	S	XXXX	XXXX	.060 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	6	53000-96	15A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 130B

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.76			
	A	.0415			
Min. drop-away without contact pressure	V	.893			
	A	.0018			
Min. drop-away	V	2.05		1.44	
	A	.0041		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.19		5.71	
	A	.0104		.0114	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	SIC	.031 in.	2 oz.	.125 in.
B SIC	to	SIC	XXXX	XXXX	.095 in.
P	to		in.	oz.	>.125 in.

Contact cap'y (Non-ind. load) 1.5 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444B
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	199454

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 131

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	15.04			
	A	.0224			
Min. drop-away without contact pressure	V	1.22			
	A	.0018			
Min. drop-away	V	2.14		1.50	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.76		4.14	
	A	.0056		.0062	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.033 in.	1.4 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224102

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	F	B	N	R
	ohms	2 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 132

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	17.40			
	A	.0272			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.05		1.41	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	4.35			
	A	.0068			
Max. working	V	6.21		6.85	
	A	.0097		.0107	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	in.	oz.	in.
B ______ to ______	XXXX	XXXX	in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 10M-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	Mod 9E	4	51300	

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	640 ohms ______ ohms ______ ohms	______ F ______ B ______ N ______ R 4 FB ______ NR

DATE 7-15-1944 TABLE NO. 133

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.70			
	A	.0292			
Min. drop-away without contact pressure	V	.960			
	A	.0015			
Min. drop-away	V	1.98		1.41	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	4.67	6.02	5.12	
	A	.0073	.0094	.008	
Max. working	V	8.06		8.86	
	A	.0126		.0138	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	in.	oz.	in.
B ______ to ______	XXXX	XXXX	in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 10M-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	Mod 9E	4	51300	

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	640 ohms ______ ohms ______ ohms	______ F ______ B ______ N ______ R 4 FB ______ NR

DATE 7-15-1944 TABLE NO. 134

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.40			
	A	.032			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4	53000-84	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	______ F ______ B ______ N ______ R 4 FB ______ NR

DATE 7-15-1944 TABLE NO. 135A

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.40			
	A	.032			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX -	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	15

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	___ F ___ B ___ N ___ R 4 FB ___ NR

DATE 7-15-1944 TABLE NO. 135B

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.40			
	A	.002			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	___ F ___ B ___ N ___ R 4 FB ___ NR

DATE 7-15-1944 TABLE NO. 135C

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.40			
	A	.032			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-207	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	___ F ___ B ___ N ___ R 4 FB ___ NR

DATE 7-15-1944 TABLE NO. 135D

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.56			
	A	.0456			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.64		8.38	
	A	.0114		.0125	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	3 oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: With magnetic blow-out.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-157	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 135E

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.44			
	A	.032			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-152	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 135F

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.44			
	A	.032			
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	4.56			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	5.36		5.90	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-199	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 135G

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.04			
	A	.0254			
Min. drop-away without contact pressure	V	.914			
	A	.0014			
Min. drop-away	V	2.25		1.58	
	A	.0033		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.26		4.69	
	A	.0064		.007	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157282

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 136A

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.04			
	A	.0254			
Min. drop-away without contact pressure	V	.914			
	A	.0014			
Min. drop-away	V	2.25		1.58	
	A	.0033		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.26		4.69	
	A	.0064		.007	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.
Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157282

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 136B

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.80			
	A	~~.340~~ → .034			
Min. drop-away without contact pressure	V	.914			
	A	.0018			
Min. drop-away	V	2.25		1.58	
	A	.0033		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.70		6.27	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to SIC	.031 in.	2 oz.	.125 in.
B S to S	XXXX	XXXX	.125 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 1.5 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444B
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	184860

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 136C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.80			
	A	.034			
Min. drop-away without contact pressure	V	.914			
	A	.0018			
Min. drop-away	V	2.25		1.58	
	A	.0034		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.70		6.27	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.125 in.
B S to S	XXXX	XXXX	.125 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444B
Remarks: Minimum compression .027 inch.
One high voltage front contact-SIC.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-103	217281

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	1-HV 1-LV F	B	N	R
	ohms	2 ~~4~~ LV FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 136D

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.80			
	A	.034			
Min. drop-away without contact pressure	V	.914			
	A	.0018			
Min. drop-away	V	2.25		1.58	
	A	.0034		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.70		6.27	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.125 in.
B S to S	XXXX	XXXX	.125 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444B
Remarks: Minimum compression .027 inch.
Two high voltage front contacts- SIC to SIC, with capacity for 1.5 amperes at 175 volts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-103	217283

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	2 HV F	B	N	R
	ohms	2 ~~4~~ LV FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 136E

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.04			
	A	.0284			
Min. drop-away without contact pressure	V	.737			
	A	.0011			
Min. drop-away	V	1.88		1.32	
	A	.0028		.002	
Min. pick-up	V	4.29			
	A	.0064			
Max. pick-up	V	4.75	5.96	5.24	
	A	.0071	.0089	.0078	
Max. working	V	5.03		5.53	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to C	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-27	151503

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 137A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.04			
	A	.0284			
Min. drop-away without contact pressure	V	.737			
	A	.0011			
Min. drop-away	V	1.88		1.32	
	A	.0028		.002	
Min. pick-up	V	4.29			
	A	.0064			
Max. pick-up	V	4.76	5.96	5.24	
	A	.0071	.0089	.0078	
Max. working	V	5.03		5.53	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to C	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	DN-11	4	C-9077-27	152449

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 137B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.76			
	A	.028			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	2.01		1.41	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V	4.69	6.03	5.16	
	A	.007	.009	.0077	
Max. working	V	8.04		8.84	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ___ to ___	___ in.	___ oz.	.050 in.
B ___ to ___	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Large coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	Mod 13	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 138

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.44			
	A	.032			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	5.36	6.70	5.90	
	A	.008	.010	.0088	
Max. working	V	8.04		8.84	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ___ to ___	___ in.	___ oz.	.050 in.
B ___ to ___	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Small coil.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	Mod 13	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 139A

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.44			
	A	.032			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	5.36	6.70	5.90	
	A	.008	.010	.0088	
Max. working	V	8.04		8.84	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Hall J	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 139B

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.44			
	A	.032			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	5.36	6.70	5.90	
	A	.008	.010	.0088	
Max. working	V	8.04		8.84	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	H	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 139C

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.80			
	A	.040			
Min. drop-away without contact pressure	V	1.81			
	A	.0027			
Min. drop-away	V	3.35		2.34	
	A	.005		.0035	
Min. pick-up	V	5.76			
	A	.0086			
Max. pick-up	V				
	A				
Max. working	V	6.70		7.37	
	A	.010		.011	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 141

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

D. C. RELAYS

4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.04			
	A	.0269			
Min. drop-away without contact pressure	V	1.09			
	A	.0016			
Min. drop-away	V	2.48		1.74	
	A	.0037		.0026	
Min. pick-up	V	4.09			
	A	.0061			
Max. pick-up	V	4.51		4.96	
	A	.0067		.0074	
Max. working	V	5.91		6.50	
	A	.0088		.0097	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	159864

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	______ F 6 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 142

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.12			
	A	.036			
Min. drop-away without contact pressure	V	.670			
	A	.001			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	6.03	7.37	6.63	
	A	.009	.011	.0099	
Max. working	V	8.70		9.57	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 13	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	______ F 6 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 143A

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.12			
	A	.036			
Min. drop-away without contact pressure	V	.670			
	A	.001			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	6.03	7.37	6.63	
	A	.009	.011	.0099	
Max. working	V	8.70		9.57	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Hall J	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	______ F 6 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 143B

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 390B
4-30-1941
7-15-1944
D. C. RELAYS

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.12			
	A	.036			
Min. drop-away without contact pressure	V	.670			
	A	.001			
Min. drop-away	V	2.35		1.65	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	6.03	7.37	6.63	
	A	.009	.011	.0099	
Max. working	V	8.70		9.57	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	H	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	670 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		6 FB		______ NR	

DATE 7-15-1944 TABLE NO. 143C

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.90			
	A	.0292			
Min. drop-away without contact pressure	V	1.87			
	A	.0025			
Min. drop-away	V	3.45		2.40	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.48		6.00	
	A	.0073		.008	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-17
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-122	20

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		2 FB		______ NR	

DATE 7-15-1944 TABLE NO. 147

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.90			
	A	.0292			
Min. drop-away without contact pressure	V	1.58			
	A	.0021			
Min. drop-away	V	2.93		2.03	
	A	.0039		.0027	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.48		6.00	
	A	.0075		.008	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 148

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	26.70			
	A	.356			
Min. drop-away without contact pressure	V	1.58			
	A	.0021			
Min. drop-away	V	2.93		2.03	
	A	.0039		.0027	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.68		7.35	
	A	.0089		.0098	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	____ in.	____ oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr45
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	45

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 149

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.20			
	A	.0284			
Min. drop-away without contact pressure	V	.975			
	A	.0013			
Min. drop-away	V	2.33		1.65	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	5.33	6.68	5.86	
	A	.0071	.0089	.0078	
Max. working	V	8.03		8.83	
	A	.0107		.0118	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 150

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.90			
	A	.0252			
Min. drop-away without contact pressure	V	.975			
	A	.0013			
Min. drop-away	V	2.02		1.42	
	A	.0027		.0019	
Min. pick-up	V				
	A				
Max. pick-up	V	4.73	6.00	5.18	
	A	.0063	.008	.0069	
Max. working	V	8.03		8.83	
	A	.0107		.0118	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 151

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.00			
	A	.032			
Min. drop-away without contact pressure	V	.675			
	A	.0009			
Min. drop-away	V	2.33		1.65	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	6.00	7.35	8.60	
	A	.008	.0098	.0088	
Max. working	V	8.70		9.60	
	A	.0116		.0128	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	750 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	6 FB		___ NR	

DATE 7-15-1944 TABLE NO. 152

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.08			
	A	.0211			
Min. drop-away without contact pressure	V	1.13			
	A	.0011			
Min. drop-away	V	2.78		1.94	
	A	.0028		.0019	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.27		5.80	
	A	.0053		.0058	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157187

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 153

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.40			
	A	.0244			
Min. drop-away without contact pressure	V	.990			
	A	.001			
Min. drop-away	V	2.45		1.72	
	A	.0025		.0017	
Min. pick-up	V				
	A				
Max. pick-up	V	6.10			
	A	.0061			
Max. working	V	6.40		7.04	
	A	.0064		.007	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to C	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-27	151728

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 154A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.40			
	A	.0244			
Min. drop-away without contact pressure	V	.990			
	A	.001			
Min. drop-away	V	2.45		1.72	
	A	.0025		.0017	
Min. pick-up	V				
	A				
Max. pick-up	V	6.10			
	A	.0061			
Max. working	V	6.40		7.04	
	A	.0064		.007	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-27	149234

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 154B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.00			
	A	.024			
Min. drop-away without contact pressure	V	1.10			
	A	.0011			
Min. drop-away	V	2.50		1.80	
	A	.0025		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V	6.00	7.00	6.60	
	A	.006	.007	.0066	
Max. working	V	9.00		9.90	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 155

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.80			
	A	.0228			
Min. drop-away without contact pressure	V	1.70			
	A	.0017			
Min. drop-away	V	3.00		2.10	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.70		6.30	
	A	.0057		.0063	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 156

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.60			
	A	.0186			
Min. drop-away without contact pressure	V	1.50			
	A	.0015			
Min. drop-away	V	2.64		1.85	
	A	.0026		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.65		5.12	
	A	.0047		.0051	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. ____
Remarks: Minimum compression .032 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224103

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
Neutral Ordinary Acting	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 7-15-1944 TABLE NO. 157

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	29.60			
	A	.0296			
Min. drop-away without contact pressure	V	2.20			
	A	.0022			
Min. drop-away	V	3.70		2.60	
	A	.0037		.0026	
Min. pick-up	V	6.40			
	A	.0064			
Max. pick-up	V				
	A				
Max. working	V	7.40		8.14	
	A	.0074		.0081	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 158

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.28			
	A	.0223			
Min. drop-away without contact pressure	V	1.34			
	A	.0013			
Min. drop-away	V	3.10		2.17	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	5.57		6.13	
	A	.0056		.0061	
Max. working	V	7.30		8.03	
	A	.0073		.008	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	158263

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
Neutral Ordinary Acting	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	6 FB		____ NR	

DATE 7-15-1944 TABLE NO. 159A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	22.28			
	A	.0223			
Min. drop-away without contact pressure	V	1.34			
	A	.0013			
Min. drop-away	V	3.10		2.17	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	5.57		6.13	
	A	.0056		.0061	
Max. working	V	7.30		8.03	
	A	.0073		.008	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	DN-11	6	C-9077-15	157602

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	4 F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 7-15-1944
TABLE NO. 159B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.026			
Min. drop-away without contact pressure	V	1.29			
	A	.0013			
Min. drop-away	V	2.50		1.80	
	A	.0025		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V	6.50		7.15	
	A	.0065		.0072	
Max. working	V	7.50		8.25	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ____
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	DN-11	6	C-9077-30	152827

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	2 F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944
TABLE NO. 160

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	32.80			
	A	.0328			
Min. drop-away without contact pressure	V	2.70			
	A	.0027			
Min. drop-away	V	3.80		2.70	
	A	.0038		.0027	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.20		9.02	
	A	.0082		.009	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28 623-9
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53000-108	19

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	8 FB		____ NR	

DATE 7-15-1944
TABLE NO. 162

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.00			
	A	.028			
Min. drop-away without contact pressure	V	1.20			
	A	.0012			
Min. drop-away	V	3.00		2.10	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V	7.00		7.70	
	A	.007		.0077	
Max. working	V	8.50		9.35	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	8	C-9077-16	142678

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	___ F	___ B	___ N	___ R
	___ ohms	8 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 163

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	29.64			
	A	.0296			
Min. drop-away without contact pressure	V	1.69			
	A	.0017			
Min. drop-away	V	3.83		2.68	
	A	.0038		.0027	
Min. pick-up	V				
	A				
Max. pick-up	V	7.41		8.15	
	A	.0074		.0082	
Max. working	V	9.70		10.67	
	A	.0097		.0107	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	10	C-9077-51	160143

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	___ F	___ B	___ N	___ R
	___ ohms	10 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 166

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.00			
	A	.030			
Min. drop-away without contact pressure	V	1.10			
	A	.0011			
Min. drop-away	V	3.10		2.17	
	A	.0031		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V	7.50		8.25	
	A	.0075		.0083	
Max. working	V	8.50		9.35	
	A	.0085		.0094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	10	C-9077-19	153159

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1000 ohms	___ F	___ B	___ N	___ R
	___ ohms	10 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 167

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.34			
	A	.088			
Min. drop-away without contact pressure	V	.254			
	A	.0067			
Min. drop-away	V	.466		.319	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.836		.920	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.25 sec. at 1.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg2
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-103	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	38 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 169A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.34			
	A	.088			
Min. drop-away without contact pressure	V	.254			
	A	.0067			
Min. drop-away	V	.466		.319	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.836		.920	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.25 sec. at 0.8 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-57 Indiv. ED 28623-7 Pg2
Remarks: Plug coupled.
Use 500 ohm resistor No. 31160-17 mounted on relay and connected across coils.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-185	50

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	38 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 169B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.34			
	A	.088			
Min. drop-away without contact pressure	V	.254			
	A	.0067			
Min. drop-away	V	.466		.319	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.836		.920	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.25 sec. at 1.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg2
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-190	80

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	38 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 169C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.34			
	A	.088			
Min. drop-away without contact pressure	V	.254			
	A	.0067			
Min. drop-away	V	.466		.319	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.836		.920	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time 0.25 sec. at 1.2 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	80

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	38 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB			___ NR

DATE 7-15-1944 TABLE NO. 169E

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.20			
	A	.104			
Min. drop-away without contact pressure	V	.375			
	A	.0075			
Min. drop-away	V	.700		.490	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.30		1.43	
	A	.026		.0286	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Approx. 1.75 sec. at 9.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr49
Remarks: Plug coupled.
Use rectifier No. 57592 Gr 1 mounted on relay and connected across coils.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4	53000-185	49

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	50 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB			___ NR

DATE 7-15-1944 TABLE NO. 170A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.20			
	A	.104			
Min. drop-away without contact pressure	V	.375			
	A	.0075			
Min. drop-away	V	.700		.490	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.30		1.43	
	A	.026		.0286	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Approx. 1.75 sec. at 9.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr41
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R. S. Co.	K	4	53000-185	41

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	50 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB			___ NR

DATE 7-15-1944 TABLE NO. 170B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	5.20			
	A	.104			
Min. drop-away without contact pressure	V	.375			
	A	.0075			
Min. drop-away	V	.700		.490	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.30		1.43	
	A	.026		.0286	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time See remarks sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr 8
Remarks: Use rectifier Dwg. no. 54728-12 Gr 1
mounted on relay and connected across coils.
Relay must hold in service on coded current.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-185	8

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	50 ohms ohms ohms	F B N R 4 FB NR

DATE 7-15-1944 TABLE NO. 170C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.80			
	A	.056			
Min. drop-away without contact pressure	V	.120			
	A	.0024			
Min. drop-away	V	.275		.192	
	A	.0055		.0038	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.700		.770	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .005 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time See remarks sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr47
Remarks: Plug coupled.
With rectifier Dwg. no. 57592 Gr 1 mounted
on relay and connected across coils.
Relay must hold in service on coded current.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-185	47

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	50 ohms ohms ohms	F B N R 4 FB NR

DATE 7-15-1944 TABLE NO. 170D

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	5.60			
	A	.136			
Min. drop-away without contact pressure	V	.500			
	A	.010			
Min. drop-away	V	.900		.630	
	A	.018		.0126	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.40		1.54	
	A	.028		.0308	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 2.2 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	in.	oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 15 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr74
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-185	74

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	50 ohms ohms ohms	F B N R 4 FB NR

DATE 7-15-1944 TABLE NO. 170E

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

D. C. RELAYS

390B
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.28			
	A	.0728			
Min. drop-away without contact pressure	V	.450			
	A	.0045			
Min. drop-away	V	.790		.553	
	A	.0079		.0055	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.82		2.00	
	A	.0182		.002	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1 to 1.35 sec. at 10 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	XXXX	XXXX	.025 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2685
Remarks: Minimum compression .032 inch.
For calibration disconnect 750 ohm resistor.
In test of timing use 750 ohm resistor as snub.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22C	2	C-9432-17	223422

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	2 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 171

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.670			
	A	.0067			
Min. drop-away	V	1.23		.860	
	A	.0123		.0086	
Min. pick-up	V	2.00			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 8.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	30

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 172A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.670			
	A	.0067			
Min. drop-away	V	1.23		.860	
	A	.0123		.0086	
Min. pick-up	V	2.00			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 6.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	30

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 172B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.670			
	A	.0067			
Min. drop-away	V	1.23		.860	
	A	.0123		.0086	
Min. pick-up	V	2.00			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.9 sec. at 3.5 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	29

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	100 ohms ____ ohms ____ ohms	__F __B __N __R 4 FB __NR

DATE 7-15-1944 TABLE NO. 173A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.670			
	A	.0067			
Min. drop-away	V	1.23		.860	
	A	.0123		.0086	
Min. pick-up	V	2.00			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.9 sec. at 3.5 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	29

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	100 ohms ____ ohms ____ ohms	__F __B __N __R 4 FB __NR

DATE 7-15-1944 TABLE NO. 173B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.32			
	A	.0932			
Min. drop-away without contact pressure	V	.490			
	A	.0049			
Min. drop-away	V	1.18		.830	
	A	.0118		.0083	
Min. pick-up	V				
	A				
Max. pick-up	V	2.33		2.56	
	A	.0233		.0256	
Max. working	V	2.57		2.83	
	A	.0257		.0283	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time (.8) sec. at (2.94) volts
Pick-up time (1.0) sec. at (3.68) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157289

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	100 ohms ____ ohms ____ ohms	__F __B __N __R 4 FB __NR

DATE 7-15-1944 TABLE NO. 174A

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B
4-30-1941
7-15-1944

D. C. RELAYS

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	8.84			
	A	.0884			
Min. drop-away without contact pressure	V	.470			
	A	.0047			
Min. drop-away	V	1.17		.820	
	A	.0117		.0082	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.21		2.43	
	A	.0221		.0243	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1 to 1.35 sec. at 10 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2684
Remarks: Minimum compression .024 inch.
For calibration disconnect 750 ohm resistor.
In test for timing use 750 ohm resistor
as snub.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11C	4	C-9077-112	217234

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 174B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.32			
	A	.0932			
Min. drop-away without contact pressure	V	.49			
	A	.0049			
Min. drop-away	V	1.18		.830	
	A	.0118		.0083	
Min. pick-up	V				
	A				
Max. pick-up	V	2.33		2.56	
	A	.0233		.0256	
Max. working	V	2.57		2.83	
	A	.0257		.0283	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time (0.8) sec. at (2.94) volts
Pick-up time (1.0) sec. at (3.68) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.
Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157289

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 174C

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	8.00			
	A	.080			
Min. drop-away without contact pressure	V	.350			
	A	.0035			
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V	2.00	2.50	2.20	
	A	.020	.025	.022	
Max. working	V	2.70		2.70	
	A	.027		.027	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.5 sec. at 10 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.018 in.	1.625 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. 10M-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	9E	4	51300	

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms	F	B	N	R
	ohms	FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 175

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.670			
	A	.0067			
Min. drop-away	V	1.23		.860	
	A	.0123		.0086	
Min. pick-up	V	2.00			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.5 sec. at 8.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-190	30

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	100 ohms ohms ohms	F 4 FB	B	N NR	R

DATE 7-15-1944 TABLE NO. 176

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.64			
	A	.070			
Min. drop-away without contact pressure	V	.760			
	A	.005			
Min. drop-away	V	1.37		.958	
	A	.009		.0663	
Min. pick-up	V	2.28			
	A	.015			
Max. pick-up	V				
	A				
Max. working	V	2.66		2.89	
	A	.0175		.019	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.5 sec. at 6.1 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-84	44

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	152 ohms ohms ohms	F 4 FB	B	N NR	R

DATE 7-15-1944 TABLE NO. 180

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	12.80			
	A	.084			
Min. drop-away without contact pressure	V	.630			
	A	.0041			
Min. drop-away	V	1.26		.882	
	A	.0063		.0058	
Min. pick-up	V				
	A				
Max. pick-up	V	3.20		3.52	
	A	.021		.0231	
Max. working	V	3.34		3.67	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.5 sec. at 9.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.031 in.	1.25 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.050 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2390B
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
U.S.&S.Co.	DN-19	4	C-9077	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	152 ohms ohms ohms	F 4 FB	B	N NR	R

DATE 7-15-1944 TABLE NO. 181

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SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	1.00			
	A	.005			
Min. drop-away	V	2.00		1.40	
	A	.001		.007	
Min. pick-up	V	3.20			
	A	.016			
Max. pick-up	V				
	A				
Max. working	V	3.60		3.96	
	A	.018		.0198	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time Min. 0.9 sec. at 5.6 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	33

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	200 ohms ____ ohms ____ ohms	____ F 4 FB	____ B	____ N ____ NR	____ R

DATE 7-15-1944 TABLE NO. 186

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.68			
	A	.0034			
Min. drop-away	V	1.30		.920	
	A	.0065		.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.60		3.96	
	A	.018		.0198	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time Min. 3.0 sec. at 10 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 37
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	37

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	200 ohms ____ ohms ____ ohms	____ F 4 FB	____ B	____ N ____ NR	____ R

DATE 7-15-1944 TABLE NO. 187

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.088			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.40		.980	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.0225		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 2 sec. at 9 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	200 ohms ____ ohms ____ ohms	____ F 4 FB	____ B	____ N ____ NR	____ R

DATE 7-15-1944 TABLE NO. 188

NYGS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	15.44			
	A	.0772			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.94		1.36	
	A	.0097		.0068	
Min. pick-up	V				
	A				
Max. pick-up	V	3.86		4.25	
	A	.0193		.0213	
Max. working	V	4.26		4.69	
	A	.0213		.0234	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time (0.8) sec. at (4.86) volts
Pick-up time (1.0) sec. at (6.10) volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in. .050
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077	

Magnetic structure: ___

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	200 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 4 FB ___ NR

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NYGS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.088			
Min. drop-away without contact pressure	V	.900			
	A	.0045			
Min. drop-away	V	1.20		.800	
	A	.006		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40	5.40	4.84	
	A	.022	.027	.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Min 3.0 sec. at 9.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ___ to ___	___ in.	___ oz.	.050 in.
B ___ to ___	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ___ Indiv. ___
Remarks: Above values apply to all 200 ohm relays of this type not listed elsewhere in Instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	200 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 4 FB ___ NR

DATE 7-15-1944 TABLE NO. 190

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.00			
	A	.084			
Min. drop-away without contact pressure	V	1.50			
	A	.006			
Min. drop-away	V	2.70		1.90	
	A	.0108		.0076	
Min. pick-up	V	4.50			
	A	.018			
Max. pick-up	V				
	A				
Max. working	V	5.30		5.83	
	A	.0212		.0233	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Min 1.0 sec. at 9.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14 Pg5
Remarks: ___

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	43

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	250 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 6 FB ___ NR

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.28			
	A	.0692			
Min. drop-away without contact pressure	V	1.04			
	A	.0041			
Min. drop-away	V	2.18		1.53	
	A	.0087		.0061	
Min. pick-up	V				
	A				
Max. pick-up	V	4.32		4.75	
	A	.0173		.019	
Max. working	V	5.67		6.24	
	A	.0227		.0249	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time Min (0.8) sec. at (6.55) volts
Pick-up time (1.0) sec. at (8.07) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	~~.020~~ in.
P ____ to ____	____ in.	____ oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	168245

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms	____ F	____ B	____ N	____ R
	____ ohms	6 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 196

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.28			
	A	.0692			
Min. drop-away without contact pressure	V	1.04			
	A	.0041			
Min. drop-away	V	2.18		1.53	
	A	.0087		.0061	
Min. pick-up	V				
	A				
Max. pick-up	V	4.32		4.75	
	A	.0173		.019	
Max. working	V	5.67		6.24	
	A	.0227		.0249	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at 6.55 volts
Release time (0.8) sec. at (8.55) volts
Pick-up time (1.0) sec. at (8.07) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	191880

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms	4 F	____ B	____ N	____ R
	____ ohms	2 FB		____ NR	
	____ ohms				

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.52			
	A	.0288			
Min. drop-away without contact pressure	V	.480			
	A	.0012			
Min. drop-away	V	1.12		.800	
	A	.0028		.002	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.88		3.16	
	A	.0072		.0079	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .005 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time Min (2.9) sec. at 8.4 volts
Pick-up time (3.2) sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-141 Gr 6
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-141	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Min (0.5) sec. at 9.0 volts
Pick-up time (0.6) sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	39

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 201A

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Min (0.5) sec. at 9.0 volts
Pick-up time (0.6) sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	39

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 201B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Min (0.9) sec. at (6.6) volts
Pick-up time (1.1) sec. at (9.5) volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	38

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 202A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.9) sec. at (6.6) volts
Pick-up time (1.0) sec. at (9.5) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	38

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	______ F 4 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 202B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1 to 1.1 sec. at 9 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-80	43

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	______ F 4 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 202C

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1 to 1.1 sec. at 9 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	50

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	______ F 4 FB	______ B	______ N ______ NR	______ R

DATE 7-15-1944 TABLE NO. 203

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.00			
	A	.0475			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	4.75		5.23	
	A	.0119		.013	
Max. working	V	5.25		5.78	
	A	.0131		.0144	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.8) sec. at (6.0) volts
Pick-up time (1.0) sec. at (7.5) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157284

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

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TABLE NO. 204

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.20			
	A	.048			
Min. drop-away without contact pressure	V	.800			
	A	.002			
Min. drop-away	V	1.60		1.12	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.80		5.28	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time Min (0.9) sec. at 9 volts
Pick-up time (1.1) sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.016 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53000-59 Gr50
Remarks: Above values apply to all 400 ohm slow release relays of this type not listed elsewhere in Instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

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TABLE NO. 205

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.80			
	A	.052			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	5.20		5.72	
	A	.013		.0143	
Max. working	V	6.80		7.48	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time Min (0.5) sec. at 9 volts
Pick-up time (0.6) sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	J	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944
TABLE NO. 206

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.40			
	A	.051			
Min. drop-away without contact pressure	V	.832			
	A	.0021			
Min. drop-away	V	2.06		1.44	
	A	.0051		.0036	
Min. pick-up	V				
	A				
Max. pick-up	V	5.10		5.61	
	A	.0128		.0140	
Max. working	V	5.36		5.90	
	A	.0134		.0147	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.6) sec. at (6.0) volts
Pick-up time (0.9) sec. at (8.0) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-27	152825

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 207A

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.40			
	A	.051			
Min. drop-away without contact pressure	V	.832			
	A	.0021			
Min. drop-away	V	2.06		1.44	
	A	.0051		.0036	
Min. pick-up	V				
	A				
Max. pick-up	V	5.10		5.61	
	A	.0128		.0140	
Max. working	V	5.36		5.90	
	A	.0134		.0147	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .020 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.6) sec. at (6.0) volts
Pick-up time (0.9) sec. at (8.0) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.033 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. ______
Remarks: Minimum compression .033 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-27	153156

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 207B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.80			
	A	.052			
Min. drop-away without contact pressure	V	.800			
	A	.002			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	5.20		5.72	
	A	.013		.0143	
Max. working	V	6.80		7.48	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time Min 0.5 sec. at 9.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	in.	oz.	in.
B ______ to ______	XXXX	XXXX	in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
H.S.&S.Co.	H	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 208

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.80			
	A	.052			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	5.20		5.72	
	A	.013		.0143	
Max. working	V	6.80		7.48	
	A	.017		.0187	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time Min 0.5 sec. at 9.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Hall	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 209

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.20			
	A	.048			
Min. drop-away without contact pressure	V	.800			
	A	.002			
Min. drop-away	V	1.60		1.12	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.80		5.28	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time Min 0.5 sec. at 9.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Above values also apply to all 400 ohm relays of this type not listed elsewhere in Instructions 390.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

DATE 7-15-1944 TABLE NO. 210

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1 to 1.1 sec. at 9.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S IC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-152	50

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	4 FB		___ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.52			
	A	.0288			
Min. drop-away without contact pressure	V	.480			
	A	.0012			
Min. drop-away	V	1.12		.800	
	A	.0028		.002	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.88		3.16	
	A	.0072		.0079	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time Min 3.0 sec. at 9 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-175 Pg2
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4	53000-175	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 212

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.1 sec. at 9 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	4	53000-190	50

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 213

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.00			
	A	.0475			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	4.75		5.23	
	A	.0119		.013	
Max. working	V	5.25		5.78	
	A	.0131		.0144	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time (0.8) sec. at (6.0) volts
Pick-up time (1.0) sec. at (7.5) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.
Plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U. S. & S. Co.	DN-11	4	C-9077-24	157284

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 214

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

D. C. RELAYS

4-30-1941
7-15-1944

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.00			
	A	.060			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	6.0		6.80	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1 to 1.1 sec. at 6.2 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.016 in.	1.75 oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 15 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Magnetic blow-outs on front contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-165	46

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	F	B	N	R
	ohms				
	ohms	4 FB		NR	

DATE 7-15-1944 TABLE NO. 215

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	17.60			
	A	.044			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.40		1.68	
	A	.006		.0042	
Min. pick-up	V	3.60			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	4.40		4.84	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.9 sec. at 6.2 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.016 in.	2.5 oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Heavy duty front and back contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-142	62

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	F	B	N	R
	ohms				
	ohms	4 FB		NR	

DATE 7-15-1944 TABLE NO. 216

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.40			
	A	.056			
Min. drop-away without contact pressure	V	1.48			
	A	.0037			
Min. drop-away	V	2.80		1.96	
	A	.007		.0049	
Min. pick-up	V	1.80			
	A	.012			
Max. pick-up	V				
	A				
Max. working	V	5.60		6.16	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.9-1.1 sec. at 9.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14 Pg
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-96	37

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.80			
	A	.0495			
Min. drop-away without contact pressure	V	1.20			
	A	.003			
Min. drop-away	V	2.50		1.75	
	A	.0063		.0043	
Min. pick-up	V				
	A				
Max. pick-up	V	4.95		5.45	
	A	.0124		.0136	
Max. working	V	6.50		7.15	
	A	.0162		.0179	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time (0.8) sec. at (7.5) volts
Pick-up time (1.0) sec. at (9.25) volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.031 in.	2 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.050 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	6	C-9077-15	159553

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 7-15-1944 TABLE NO. 219

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.08			
	A	.0652			
Min. drop-away without contact pressure	V	1.48			
	A	.0037			
Min. drop-away	V	2.76		1.92	
	A	.0069		.0048	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.52		7.16	
	A	.0163		.0179	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time 0.9 sec. at 8.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.016 in.	1.75 oz.	.125 in.
B	S	to	S	XXXX	XXXX	.095 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-7 Pg3
Remarks: Heavy duty front and back contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-133	51

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 7-15-1944 TABLE NO. 220

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.04			
	A	.0512			
Min. drop-away without contact pressure	V	1.30			
	A	.0029			
Min. drop-away	V	2.43		1.71	
	A	.0054		.0038	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.76		6.35	
	A	.0128		.0141	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Approx. 15 sec. at 10 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.125 in.
B	S	to	S	XXXX	XXXX	.095 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-14 Pg
Remarks: Heavy duty contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-133	77B

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	450 ohms ohms ohms	F	B	N	R
		6 FB		NR	

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NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

NYCS
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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.80			
	A	.0476			
Min. drop-away without contact pressure	V	1.25			
	A	.0025			
Min. drop-away	V	3.0		2.10	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	5.95		6.55	
	A	.0119		.0131	
Max. working	V	6.56		7.22	
	A	.0131		.0144	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.8) sec. at (7.5) volts
Pick-up time (1.0) sec. at (9.38) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	X X X X	X X X X	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-24	157188

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 228

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.00			
	A	.052			
Min. drop-away without contact pressure	V	1.80			
	A	.0036			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V	5.50			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time See remarks sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.015 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-6 Pg 1
Remarks: Plug coupled.
With rectifier 57592 Gr 1 mounted on relay
and connected across coils.
Relay must hold in service on coded current.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-181	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 229

NYCS
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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.60			
	A	.0272			
Min. drop-away without contact pressure	V	.400			
	A	.0008			
Min. drop-away	V	1.15		.805	
	A	.0023		.0016	
Min. pick-up	V				
	A				
Max. pick-up	V	3.40		3.74	
	A	.0068		.0075	
Max. working	V	6.00		6.60	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .018 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 0.8 sec. at 8.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	X X X X	X X X X	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 13	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 230

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	15.12			
	A	.028			
Min. drop-away without contact pressure	V	.756			
	A	.0014			
Min. drop-away	V	1.62		1.133	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V	3.78		4.16	
	A	.007		.0077	
Max. working	V	6.48		7.13	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.8 sec. at 10 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	.018 in.	1.625 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. 10M-14
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	Mod 9E	4	51300	

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	540 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944
TABLE NO. 235

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	28.00			
	A	.056			
Min. drop-away without contact pressure	V	1.50			
	A	.003			
Min. drop-away	V	3.60		2.52	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 1.5 sec. at 9.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 50
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-85	50

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 7-15-1944
TABLE NO. 250

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		(1)	(2)	Normal	Reverse
Initial charge	V	20.88			
	A	.036			
Min. drop-away without contact pressure	V	1.57	2.32		
	A	.0027	.004		
Min. drop-away	V	2.90	3.83	2.67	
	A	.005	.0066	.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.22	7.20	7.89	
	A	.009	.0124	.0136	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 1.5 sec. at 9.2 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-119
Remarks: For operation on 4 lead cells or equivalent.
Values under (1) are values of standard relay before leakage strips are applied.
Values under (2) are after leakage strips are applied.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-113	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	580 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944
TABLE NO. 255

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	25.98			
	A	.0448			
Min. drop-away without contact pressure	V	1.91	2.09		
	A	.0033	.0036		
Min. drop-away	V	3.48	3.77	2.67	
	A	.006	.0065	.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.50	7.19	7.89	
	A	.0112	.0124	.0136	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 1.5 sec. at 9.2 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-120
Remarks: For operation on 4 lead cells or equivalent.
Values under (1) are values of standard relay before leakage strips are applied.
Values under (2) are after leakage strips are applied.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-114	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	580 ohms	____ F	____ B	____ N	____ R
	____ ohms	6 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 260

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.030			
Min. drop-away without contact pressure	V	1.94			
	A	.0022			
Min. drop-away	V	3.60	4.00	2.82	
	A	.0041	.0045	.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.40	8.80	9.68	
	A	.0073	.010	.011	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 1.5 sec. at 11.5 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-119
Remarks: For operation on 5 lead cells or equivalent.
Values under (1) are values of standard relay before leakage strips are applied.
Values under (2) are after leakage strips are applied.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-113	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	880 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 262

NYCS
SC-48

INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.030			
Min. drop-away without contact pressure	V	2.20			
	A	.0025			
Min. drop-away	V	3.14		2.90	
	A	.0047		.0033	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.80		9.68	
	A	.010		.011	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 1.5 sec. at 11.5 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-118
Remarks: No. 4 contact make before break.
Secondary relay of primary-secondary combination.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-112	8

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	880 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

DATE 7-15-1944 TABLE NO. 263

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.030			
Min. drop-away without contact pressure	V	1.94			
	A	.0022			
Min. drop-away	V	3.60	4.00	2.82	
	A	.0041	.0045	.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.40	8.80	9.68	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time 1.5 sec. at 11.5 volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-119
Remarks: Plug coupled.
For operation on 5 cells of lead cells
or equivalent.
Values under (1) are values of standard
relay before leakage strips are applied.
Values under (2) are after leakage strips are.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-174	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	880 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 264

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	31.68			
	A	.036			
Min. drop-away without contact pressure	V	2.38	2.55		
	A	.0027	.0029		
Min. drop-away	V	4.31	4.66	3.26	
	A	.0049	.0053	.0037	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.92	10.6	11.62	
	A	.009	.012	.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time 1.5 sec. at 11.5 volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to SC	.016 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-120
Remarks: Secondary relay of primary-secondary
combination.
Values under (1) are values of standard
relay before leakage strips are applied.
Values under (2) are after leakage strips
are applied.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53000-119	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	880 ohms	___ F	___ B	___ N	___ R
	___ ohms	6 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 265

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.52			
	A	.0428			
Min. drop-away without contact pressure	V	2.16			
	A	.0024			
Min. drop-away	V	4.14		2.88	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.63		10.62	
	A	.0107		.0118	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time 1.5 sec. at 13 volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.016 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-118
Remarks: Secondary relay of primary-secondary
combination.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-112	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	900 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 270

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	35.64			
	A	.0396			
Min. drop-away without contact pressure	V	2.16			
	A	.0024			
Min. drop-away	V	4.05		2.88	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.91		9.81	
	A	.0099		.0109	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time Min. 2.0 sec. at 11.25 volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-118
Remarks: Secondary relay of primary-secondary combination.
No. 4 contact make before break.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-112	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	900 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 271

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	35.28			
	A	.0392			
Min. drop-away without contact pressure	V	2.25			
	A	.0025			
Min. drop-away	V	4.05	4.05	2.88	
	A	.0045	.0045	.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.82		9.72	
	A	.0098		.0108	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time Min 2.0 sec. at 11.0 volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 42
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	42

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	900 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 272

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.40			
	A	.100			
Min. drop-away without contact pressure	V	.290			
	A	.0045			
Min. drop-away	V	.736		.515	
	A	.0115		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.60		1.76	
	A	.025		.0275	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time See remarks sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	1.25 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2390 Indiv. 2390C
Remarks: Minimum compression .027 inch.
Maximum drop-away .83 V- .013 A.
Recommended working- 4.0 V- .0625 A.
Timing is ensured by adjustment of release within maximum and minimum limits by means of magnetic shunt.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-18C	4	C-9077-101	217453

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP SLOW RELEASE	64 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 273

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.40			
	A	.100			
Min. drop-away without contact pressure	V	.290			
	A	.0045			
Min. drop-away	V	.736		.515	
	A	.0115		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.6		1.76	
	A	.025		.0275	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time See remarks sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	1.25 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2390 Indiv. 2390C
Remarks: Minimum compression .027 inch.
Maximum drop-away .83 V- .013 A.
Recommended working 4.0 V- .0625 A.
Timing is ensured by adjustment of release within maximum and minimum limits by means of magnetic shunt.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-18C	6	C-9077-101	217454

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	64 ohms	___F ___B ___N ___R
SLOW PICK-UP	___ ohms	
SLOW RELEASE	___ ohms	6 FB ___ NR

DATE 7-15-1944 TABLE NO. 274

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD Normal	FIELD Reverse
Initial charge	V	21.7	10.5		
	A	.062	.030		
Min. drop-away without contact pressure	V	1.65	2.28		
	A	.0047	.0065		
Min. drop-away	V	3.08	4.20	2.94	
	A	.0088	.012	.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.43	7.91	8.72	
	A	.0155	.0226	.0249	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.1 sec. at 10 volts
Pick-up time 2.3 sec. at 10 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 78
Remarks:
(1) Values before leakage strips are applied.
(2) Values after leakage strips are applied.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	78

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	350 ohms	___F ___B ___N ___R
SLOW PICK-UP	___ ohms	
SLOW RELEASE	___ ohms	4 FB ___ NR

DATE 7-15-1944 TABLE NO. 275

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.00			
	A	.0314			
Min. drop-away without contact pressure	V	1.36			
	A	.0039			
Min. drop-away	V	3.40		2.38	
	A	.0097		.0068	
Min. pick-up	V				
	A				
Max. pick-up	V	7.46			
	A	.0213			
Max. working	V	9.00		9.90	
	A	.0257		.0283	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.7-1.1 sec. at 7.46-10 volts
Pick-up time 2.3-2.0 sec. at 10.0-11.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	1.25 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2390 Indiv. ____
Remarks: Minimum compression .027
Recommended working 10.0 V.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-18	4	C-9077-74	172634

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	350 ohms	___F ___B ___N ___R
SLOW PICK-UP	___ ohms	
SLOW RELEASE	___ ohms	4 FB ___ NR

DATE 7-15-1944 TABLE NO. 276

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.712		.712	
	A	.356		.356	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.134		.134	
	A	.067		.067	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.178		.196	
	A	.089		.098	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.024 in.	1.25 oz.	.040 in.
B S to S	X X X X	X X X X	.040 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-200
Remarks: Adjustable core.
Adjust core for drop-away at .067 amps.
Values shown above are for checking relay adjustment.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-172	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	2 ohms	___ F	___ B	___ N	___ R
	___ ohms	2 FB		___ NR	
	___ ohms				

DATE 7-5-1944 TABLE NO. 277A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.52		1.52	
	A	.760		.760	
Min. drop-away without contact pressure	V	.122			
	A	.061			
Min. drop-away	V	.216		.189	
	A	.108		.0945	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.380		.418	
	A	.190		.209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033 in.	1.4 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666C
Remarks: Minimum compression .032 inch.
Two 4 ohm coils in multiple.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22	2	C-9432-24	224111

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	2 ohms	___ F	___ B	___ N	___ R
	___ ohms	2 FB		___ NR	
	___ ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.60		1.60	
	A	.800		.800	
Min. drop-away without contact pressure	V	.100			
	A	.050			
Min. drop-away	V	.240		.197	
	A	.120		.0985	
Min. pick-up	V				
	A				
Max. pick-up	V	.400			
	A	.200			
Max. working	V	.480		.528	
	A	.240		.264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	X X X X	X X X X	.050 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444D
Remarks: Minimum compression .027 inch.
Two 4 ohm coils in multiple.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11	4	C-9077-56	178009

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	2 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.36		1.36	
	A	.340		.340	
Min. drop-away without contact pressure	V	.096			
	A	.024			
Min. drop-away	V	.172		.141	
	A	.043		.0352	
Min. pick-up	V	.292			
	A	.073			
Max. pick-up	V				
	A				
Max. working	V	.340		.374	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 6
Remarks: Standard relay with one yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.36		1.36	
	A	.340		.340	
Min. drop-away without contact pressure	V	.072			
	A	.018			
Min. drop-away	V	.172		.141	
	A	.043		.0352	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.340		.374	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ____
Remarks: Standard relay with one yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-84	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.38		2.38	
	A	.340		.340	
Min. drop-away without contact pressure	V	.168			
	A	.024			
Min. drop-away	V	.301		.246	
	A	.043		.0352	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.597		.655	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 1
Remarks: Standard relay with one yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	1

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	F	B	N	R
	3 ohms	4 FB		NR	
	ohms				

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D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.10		2.10	
	A	.300		.300	
Min. drop-away without contact pressure	V	.168			
	A	.024			
Min. drop-away	V	.301		.246	
	A	.043		.0352	
Min. pick-up	V	.455			
	A	.065			
Max. pick-up	V	.525		.581	
	A	.075		.083	
Max. working	V	.595		.655	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 63
Remarks: Standard relay with one yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	63

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	____ F	____ B	____ N	____ R
	3 ohms	4 FB		____ NR	
	____ ohms				

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D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.38		2.38	
	A	.340		.340	
Min. drop-away without contact pressure	V	.126			
	A	.018			
Min. drop-away	V	.301		.246	
	A	.043		.0352	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.595		.655	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	.050 in.
B ______ to ______	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	____ F	____ B	____ N	____ R
	3 ohms	4 FB		____ NR	
	____ ohms				

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D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.10		2.10	
	A	.300		.300	
Min. drop-away without contact pressure	V	.126			
	A	.018			
Min. drop-away	V	.238		.174	
	A	.034		.0248	
Min. pick-up	V				
	A				
Max. pick-up	V	.525			
	A	.075			
Max. working	V	.595	.742	.655	
	A	.085	.106	.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SC to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Standard relay with one yoke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK SHUNT	4 ohms	____ F	____ B	____ N	____ R
	3 ohms	4 FB		____ NR	
	____ ohms				

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.010 in.	.625 oz.	.020 in.
B S to S	XXXX	XXXX	.010 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: Adjustable pole piece.
Minimum pick-up .060 D.A. .029 amps.
Maximum pick-up .325 D.A. .270 amps.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	F	1	47400	

Magnetic structure: ____

KIND	RESISTANCE	CONTACTS			
NEUTRAL QUICK ACTING	2 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		1 FB		____ NR	

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	130.0			
	A	.148			
Min. drop-away without contact pressure	V	22.0			
	A	.025			
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V	60.0			
	A	.0684			
Max. working	V	70.0			
	A	.080			
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.090 in.
B ____ to ____	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: Values shown are for 875 ohm winding.
Maximum pick-up for .24 ohm winding
should not exceed 2 amps.
Solinoid type relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.		1	E-1591-2	

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND	.24 ohms 875 ohms ____ ohms	____ F	____ B	____ N	____ R
		1 FB		____ NR	

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.50			
	A	.340			
Min. drop-away without contact pressure	V	.700			
	A	.025			
Min. drop-away	V	1.20		.840	
	A	.043		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.38		2.63	
	A	.085		.094	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 29
Remarks: Compound relay with one yoke used
in car retarder yard track circuits.
Values shown are for 28 ohm winding.
Minimum pick-up of .04 ohm winding-2.5 amps.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-85	29

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND	.04 ohms 28 ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	27.0			
	A	.054			
Min. drop-away without contact pressure	V	2.0			
	A	.004			
Min. drop-away	V	3.5		2.35	
	A	.007		.0047	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.3	
	A	.0115		.0126	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr 98
Remarks: Values shown above are for 500 ohm winding.
Maximum pick-up on .108 ohm winding- .58 amps.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-185	98

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND	.108 ohms 500 ohms ______ ohms	______ F	______ B	______ N	______ R
		2 FB		______ NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.0			
	A	.100			
Min. drop-away without contact pressure	V	1.75			
	A	.007			
Min. drop-away	V	3.10		2.00	
	A	.0124		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A	*2.5			
Max. working	V	6.25		6.75	
	A	.025		.027	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time 0.2 sec. at 9 volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 46
Remarks: *Value when using .04 ohm winding and is to check that coil is in proper position.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	4	53000-85	46

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND SLOW PICK-UP	.04 ohms 250 ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		(1)	(2)	(1)	(2)
Initial charge	V	.720	24.0		
	A	.720	.048		
Min. drop-away without contact pressure	V	.059	2.00		
	A	.059	.004		
Min. drop-away	V	.110	3.50	.077	2.45
	A	.110	.007	.077	.0049
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.180	6.00	.198	6.60
	A	.180	.012	.198	.0132
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind.load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ______
Remarks:
(1) 1 ohm values.
(2) 500 ohm values.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	2	53000-185	12

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND	1 ohms 500 ohms ______ ohms	______ F	______ B	______ N	______ R
		2 FB		______ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	11.20			
	A	.080			
Min. drop-away without contact pressure	V	.910			
	A	.0065			
Min. drop-away	V	1.68		1.18	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.80		3.08	
	A	.020		.022	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Approx .15 sec. at 3.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.029 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 71
Remarks: Test each winding separately.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	2	53000-85	71

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND	140 ohms 140 ohms ohms	F	B	N	R
		2 FB		NR	

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D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.24			
	A	.064			
Min. drop-away without contact pressure	V	.768			
	A	.0048			
Min. drop-away	V	1.42		.992	
	A	.0089		.0062	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.56		2.82	
	A	.016		.0176	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time Approx. .15 sec. at 3.5 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr106
Remarks: Test each winding separately.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-85	106

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL COMPOUND SLOW RELEASE	160 ohms 160 ohms ohms	F	B	N	R
		4 FB		NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.060 in.	3 oz.	in.
B S to S	XXXX	XXXX	in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 82
Remarks: Two 100 ohm coils in multiple.
Float point- .035 to .036 amperes.
Special contact adjustment.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-85	82

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL CUT-IN	50 ohms ohms ohms	F	B	N	R
		2 FB		NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.496			
	A	.0448			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.343		.242	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.874		.960	
	A	.0112		.0123	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.006 in.	15.5 oz.	.020 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 2723 Indiv. ______
Remarks: Above values taken with back strap screwed down tightly against pole pieces.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DNL-4	2	C-9393-3	182805

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	78 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	2 FB		___ NR	

DATE 7-15-1944 TABLE NO. 324

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.44			
	A	.0356			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.437		.306	
	A	.0035		.0024	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.11		1.22	
	A	.0089		.0098	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.006 in.	.5 oz.	.020 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 2723 Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DNL-4	2	C-9393-3	186960

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	125 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	2 FB		___ NR	

DATE 7-15-1944 TABLE NO. 330

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V	3.24			
	A	.180			
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .030 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	______ in.	3 oz.	______ in.
B S to S	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 14
Remarks: With special adjustor.
Float point .062 to .067 amperes with pressure released.
Float point- Field adjustment .170 to .175 amperes to make and break back contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-185	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL POWER TRANSFER	18 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms	2 FB		___ NR	

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	7.0		4.9	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.0		9.9	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .048 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.063 in.	3 oz.	.090 in.
B S	to	SIC	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666D
Remarks: Operating values are for 60 cycle A.C.
Relay has rectifier attached to back strap.
Normal A.C. volts- 10.
At release and pick-up when armature starts to move, it should complete its stroke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22P	2	C-9432-20	223526

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL POWER TRANSFER	75 ohms 75 ohms ohms	F	B	N	R
		2 FB		NR	

DATE 7-15-1944 TABLE NO. 354

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	7.0		4.9	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.0		9.9	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .048 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.063 in.	3 oz.	.090 in.
B S	to	SIC	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2666 Indiv. 2666D
Remarks: Operating values are for 60 cycle A.C.
Relay has a rectifier attached to back strap.
Normal A.C. volts- 10.
At release and pick-up when armature starts to move, it should complete its stroke.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-22P	2	C-9432-6	196328

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL POWER TRANSFER	75 ohms 75 ohms ohms	F	B	N	R
		2 FB		NR	

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	7.0		4.9	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.0		9.9	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .037 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.042 in.	3 oz.	.090 in.
B S	to	SIC	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444H
Remarks: Operating values are for 60 cycle A.C.
Relay has a rectifier attached to back strap.
Normal A.C. volts- 10.
At release and pick-up when the armature starts to move, it should complete its stroke.
Minimum compression .037 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DN-11P	4	C-9077-109	220131

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL POWER TRANSFER	75 ohms 75 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 356

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.7		4.7	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.0		8.80	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .050 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.045 in.	.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 7.5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-127
Remarks: Relay operates on any frequency.
Values shown are A.C.
Relay equipped with rectifier no.54728-5 Grl
Normal A.C. volts- 10.
Heavy duty front and back contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-123	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL POWER TRANSFER	132 ohms 132 ohms ____ ohms	____ F ____ B ____ N ____ R 2 FB ____ NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.0			
	A	.140			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.40		2.38	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.035		.0385	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 28
Remarks: Special coil spring under armature
for quick drop-away.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53000-85	28

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL POWER TRANSFER	200 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 8 FB ____ NR

DATE 7-15-1944 TABLE NO. 365

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.0			
	A	.200			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.150			
	A	.030			
Min. pick-up	V	.85			
	A	.170		8.0	
Max. pick-up	V	.90			
	A	.180			
Max. working	V	.90		4 Sec.	
	A	.180		at 12.0	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 4 sec. at 12 amps. volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	.035* in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 3287 Indiv. ____
Remarks: Shunt resistor .032 ohms.
Disconnect shunt resistor to take pick-up
and release values.
*Note- Fully open.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	OR-10	2	B-12739-2	195969

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
NEUTRAL OVERLOAD	5 ohms ____ ohms ____ ohms	____ F 1 B ____ N ____ R ____ FB ____ NR

DATE 7-15-1944 TABLE NO. 370

SIGNAL AND TRAIN CONTROL COMMITTEE 390B
D. C. RELAYS
4-30-1941
7-15-1944

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.0			
	A	.200			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.150			
	A	.030			
Min. pick-up	V	.850			
	A	.170		8.0	
Max. pick-up	V				
	A				
Max. working	V	.900		4 Sec.	
	A	.180		at 12.0	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 4 sec. at 12 amps. volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	in.	oz.	.040 in.
B S to S	XXXX	XXXX	.035* in.
B S to S	.025 in.	oz.	.060* in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 3287 Indiv. ____
Remarks: Shunt resistor .032 ohms.
Stick coil 65 ohms. Series resistors 200 ohms
Disconnect shunt resistor to take pick-up
and drop-away values.
*Note- Fully open.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	OR-11	2	B-12739-2	192910

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	5 ohms 65 ohms ohms	F	1 B	N	R
		1 FB		NR	

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.0			
	A	.200			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.150			
	A	.030			
Min. pick-up	V	.850			
	A	.170		15.0	
Max. pick-up	V				
	A				
Max. working	V	.900		2.5 Sec	
	A	.180		at 20.0	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 2.5 sec. at 20 amps. volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	.040 in.
B S to S	XXXX	XXXX	.035* in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 3287 Indiv. ____
Remarks: Shunt resistor- .0135 ohms.
Disconnect shunt resistor to take pick-up
and release values.
*Note- Fully open.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	OR-10	2	B-12739-2	213453

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	5 ohms ohms ohms	F	1 B	N	R
		FB		NR	

DATE 7-15-1944 TABLE NO. 372

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.0			
	A	.200			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.150			
	A	.030			
Min. pick-up	V	.850			
	A	.170		15.0	
Max. pick-up	V				
	A				
Max. working	V	.900		2.5 Sec	
	A	.180		at 20.0	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 2.5 sec. at 20 amps. volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	in.	oz.	.040 in.
B S to S	XXXX	XXXX	.035* in.
B S to S	in.	oz.	.060* in.

Contact cap'y (Non-ind. load) 4 amps. at 15 volts (Par. 33)
Manuf., Spec; Gen. 3287 Indiv. ____
Remarks: Shunt resistor- .0135 ohms.
Stick coil 65 ohms. Series resistor 200 ohms.
Disconnect shunt resistor to take pick-up
and release values.
*Note- Fully open.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	OR-11	2	B-12739-2	213454

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	5 ohms 65 ohms ohms	F	1 B	N	R
		1 FB		NR	

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	15.20			
	A	.076			
Min. drop-away without contact pressure	V	1.08			
	A	.0054			
Min. drop-away	V	1.80		1.26	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V	3.80			
	A	.019			
Max. working	V	5.20		5.72	
	A	.026		.0286	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	in.	1.625 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 32)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 96
Remarks: Adjustable pressure spring.
Values shown are for 200 ohm winding with pressure spring fully released.
Adjust pressure spring for pick-up on .053 ohm winding at 11 amperes.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-85	96

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.053 ohms 200 ohms ohms	F	B	N	R
		2 FB		NR	

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.0			
	A	.084			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.125		.800	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.78	
	A	.021		.0231	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B S to S	XXXX	XXXX	.090 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 15 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr 43
Remarks: Adjustable pressure spring.
Values shown above are for 250 ohm winding with pressure spring fully released.
Adjust pressure spring for pick-up on .053 ohm winding at 11 amperes.
Magnetic blow-out.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-185	43

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.053 ohms 250 ohms ohms	F	2 B	N	R
		FB		NR	

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.10			
	A	.0812			
Min. drop-away without contact pressure	V	1.76			
	A	.0068			
Min. drop-away	V	2.94		2.05	
	A	.0113		.0079	
Min. pick-up	V				
	A				
Max. pick-up	V	5.28			
	A	.0203			
Max. working	V	7.60		8.35	
	A	.0292		.0321	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	in.	1.625 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 103
Remarks: Adjustable pressure spring.
Values shown above are for 260 ohm winding with pressure spring fully released.
Adjust pressure spring for pick-up on either .053 ohm winding at 10 amperes.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-85	103

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.053 ohms .053 ohms 260 ohms	F	B	N	R
		2 FB		NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.0			
	A	.05			
Min. drop-away without contact pressure	V	1.68			
	A	.0042			
Min. drop-away	V	2.80		1.96	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V	5.00			
	A	.0125			
Max. working	V	7.20		7.92	
	A	.018		.0198	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	____ in.	1.625 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-85 Gr 89
Remarks: Adjustable pressure spring.
Values shown above are for 400 ohm winding, with pressure spring fully released.
Adjust pressure spring for pick-up on .053 ohm winding at 9.0 amperes.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-85	89

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.053 ohms	____ F	____ B	____ N	____ R
	400 ohms	2 FB		____ NR	
	____ ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	94.4			
	A	.051			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	4.90		3.52	
	A	.0027		.0019	
Min. pick-up	V				
	A				
Max. pick-up	V	23.50		25.90	
	A	.0127		.014	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	.090 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 15 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr30
Remarks: Adjustable pressure spring.
Values shown above are for 1850 ohm winding with pressure spring fully released.
Adjust pressure spring for pick-up on .053 ohm winding at 11 amperes.
Magnetic blow-out.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-185	30

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.053 ohms	____ F	2 B	____ N	____ R
	1850 ohms	____ FB		____ NR	
	____ ohms				

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-111
Remarks: Relay operates on unbalance of .001 to .002 amperes.
For operation on 14 to 18 volt battery.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53410-12	1

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL GROUND DETECTOR	8120 ohms	____ F	____ B	____ N	____ R
	____ ohms	4 FB		____ NR	
	____ ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-111
Remarks: Relay operates on unbalance of .001
to .002 amperes.
For operation on 110 to 130 volt battery.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53410-21	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL GROUND DETECTOR	40,000 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	1 FB		1 NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.85			
	A	.168			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.297		.208	
	A	.027		.0189	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.460		.510	
	A	.042		.0464	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.024 in.	.375 oz.	.040 in.
B S to S	XXXX	XXXX	.010 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53000-185 Gr28
Remarks: Adjustable front core.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	2	53000-185	28

Magnetic structure: Silicom steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	11 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	1 FB		____ NR	

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.81			
	A	.036			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.312		.218	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.702		.772	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	____ in.	.25 oz.	.020 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. 1760 Indiv. ____
Remarks: Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DNL-3	1	B-12417-X9	135689

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS	
NEUTRAL APPROACH LIGHT	78 ohms	____ F	____ B
	____ ohms		
	____ ohms	X /	

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NEW YORK CENTRAL SYSTEM SIGNAL AND TRAIN CONT

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.03			
	A	.0344			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.176		.123	
	A	.002		.0014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.757		.836	
	A	.0086		.0095	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .004 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.010 in.	.5 oz.	.020 in.
B S to S	X X X X	X X X X	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ___ Indiv. 10M-96
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	W	1	54251-11	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	88 ohms	___ F	___ B	___ N	___ R
	___ ohms	1 FB		___ NR	
	___ ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.38			
	A	.0384			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.282		.194	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.845		.925	
	A	.0096		.0105	
Max. polar pick-up and working	V	-			
	A				

Min. physical air gap; Neutral .004 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.008 in.	.25 oz.	.020 in.
B S to S	X X X X	X X X X	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ___ Indiv. 54251-14 Gr 5
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	W	2	54251-14	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	88 ohms	___ F	___ B	___ N	___ R
	___ ohms	2 FB		___ NR	
	___ ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	3.55			
	A	.0284			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.400		.280	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.8875		.976	
	A	.0071		.0078	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	___ in.	.25 oz.	.020 in.
B S to S	X X X X	X X X X	.050 in.
P ___ to ___	___ in.	___ oz.	.020 in.

Contact cap'y (Non-ind. load) ___ amps. at ___ volts (Par. ___)
Manuf., Spec; Gen. 1760 Indiv. ___
Remarks: Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DNL-3	1	B-12417-9	138135

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL APPROACH LIGHT	125 ohms	___ F	___ B	___ N	___ R
	___ ohms	1 FB		___ NR	
	___ ohms				

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.880		.880	
	A	.440		.440	
Min. drop-away without contact pressure	V	.044			
	A	.022			
Min. drop-away	V	.108		.088	
	A	.054		.044	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.220		.242	
	A	.110		.121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.072 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression .027 inch.
Minimum pick-up shall not be less than actual working.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U. S. & S. Co.	DX-13	8	C-9242-3	158832

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	2 ohms 2 ohms ohms	F	B	N	R
		8 FB		NR	

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	.872		.872	
	A	.436		.436	
Min. drop-away without contact pressure	V	.056			
	A	.028			
Min. drop-away	V	.108		.088	
	A	.054		.044	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.218		.240	
	A	.109		.120	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
Minimum pick-up shall not be less than actual working.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-20	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	2 ohms 2 ohms ohms	F	B	N	R
		8 FB		NR	

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INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.300		.330	
	A	.075		.0825	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.072 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U. S. & S. Co.	DX-13	8	C-9242-3	155293

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ohms	F	B	N	R
		8 FB		NR	

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312		.343	
	A	.078		.0858	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53003-33	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ohms	F	B	N	R
			8 FB		NR

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312		.343	
	A	.078		.0858	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53003-20	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ohms	F	B	N	R
			8 FB		NR

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.25		1.25	
	A	.312		.312	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.108	
	A	.037		.027	
Min. pick-up	V				
	A				
Max. pick-up	V	.312	.392	.343	
	A	.078	.098	.0858	
Max. working	V	.480		.528	
	A	.120		.132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.050 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ohms	F	B	N	R
			8 FB		NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.25		1.25	
	A	.312		.312	
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312		.343	
	A	.078		.0858	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53003-46	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		___ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		(1)	(2)	(1)	(2)
Initial charge	V	1.25	16.20	1.25	
	A	.312	.036	.312	
Min. drop-away without contact pressure	V	.088	1.22		
	A	.022	.0027		
Min. drop-away	V	.148	2.02	.120	1.44
	A	.037	.0045	.030	.0032
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	4.27	.343	4.72
	A	.078	.0095	.0858	.0105
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values ror 450 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8		

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 450 ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		___ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		(1)	(2)	(1)	(2)
Initial charge	V	1.25	16.20	1.25	
	A	.312	.036	.312	
Min. drop-away without contact pressure	V	.088	1.22		
	A	.022	.0027		
Min. drop-away	V	.148	2.03	.120	1.44
	A	.037	.0045	.030	.0032
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	4.28	.343	4.73
	A	.078	.0095	.0858	.0105
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 450 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53003-28	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 450 ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		___ NR	

DATE 7-15-1944 TABLE NO. 465B

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	18.00	1.25	
	A	.312	.040	.312	
Min. drop-away without contact pressure	V	.060	.900		
	A	.015	.002		
Min. drop-away	V	.148	1.80	.108	1.26
	A	.037	.004	.027	.0028
Min. pick-up	V				
	A				
Max. pick-up	V	.312	4.50	.343	4.95
	A	.078	.010	.0858	.011
Max. working	V	.480	6.30	.528	6.93
	A	.120	.014	.132	.0154
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 450 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 465C

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.33	16.20	1.33	
	A	.332	.036	.332	
Min. drop-away without contact pressure	V	.088	1.22		
	A	.022	.0027		
Min. drop-away	V	.148	2.03	.120	1.44
	A	.037	.0045	.030	.0032
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.332	4.59	.365	5.04
	A	.083	.0102	.0913	.0112
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-24
Remarks: Heavy duty back contacts.
(1) Values for 4 ohm winding.
(2) Values for 450 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-46	9

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 465D

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.22			
	A	.0027			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.05		4.46	
	A	.009		.0099	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-20	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	450 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.22			
	A	.0027			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.27		4.72	
	A	.0095		.0105	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-33	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	450 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 466B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.00			
	A	.040			
Min. drop-away without contact pressure	V	.900			
	A	.002			
Min. drop-away	V	1.80			
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V	4.50	5.63	4.95	
	A	.010	.0125	.011	
Max. working	V	6.30		6.93	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	450 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.20			
	A	.036			
Min. drop-away without contact pressure	V	1.22			
	A	.0027			
Min. drop-away	V	2.03		1.44	
	A	.0045		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.64		5.09	
	A	.0103		.0113	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-24
Remarks: Heavy duty back contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-20	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	450 ohms 450 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	30.00	1.25	
	A	.312	.060	.312	
Min. drop-away without contact pressure	V	.088	2.00		
	A	.022	.004		
Min. drop-away	V	.148	3.30	.120	2.30
	A	.037	.0066	.030	.0046
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	7.50	.343	8.25
	A	.078	.015	.0825	.0165
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 500 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-33	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms	F	B	N	R
	500 ohms	8 FB		NR	
	ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	26.60	1.25	
	A	.312	.0532	.312	
Min. drop-away without contact pressure	V	.088	2.00		
	A	.022	.004		
Min. drop-away	V	.148	3.30	.120	2.30
	A	.037	.0066	.030	.0046
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	6.65	.343	7.30
	A	.078	.0133	.0858	.0146
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 500 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-36	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms	F	B	N	R
	500 ohms	8 FB		NR	
	ohms				

DATE 7-15-1944 TABLE NO. 470B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	20.00	1.25	
	A	.312	.040	.312	
Min. drop-away without contact pressure	V	.060	.750		
	A	.015	.0015		
Min. drop-away	V	.148	2.00	.108	1.40
	A	.037	.004	.027	.0028
Min. pick-up	V				
	A				
Max. pick-up	V	.312	5.00	.343	5.50
	A	.078	.010	.0858	.011
Max. working	V	.480	6.50	.528	7.15
	A	.120	.013	.132	.0143
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 500 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms	F	B	N	R
	500 ohms	8 FB		NR	
	ohms				

DATE 7-4-15-1944 TABLE NO. 470C

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	18.60	1.25	
	A	.312	.0372	.312	
Min. drop-away without contact pressure	V	.088	1.35		
	A	.022	.0027		
Min. drop-away	V	.148	2.30	.120	1.60
	A	.037	.0046	.030	.0032
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	4.65	.343	5.10
	A	.078	.0093	.0858	.0102
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 500 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53003-46	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 500 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 470D

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.20	15.00	1.20	
	A	.300	.030	.300	
Min. drop-away without contact pressure	V	.060	.750		
	A	.015	.0015		
Min. drop-away	V	.148	1.85	.120	1.30
	A	.037	.0037	.030	.0026
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.300	3.75	.330	4.125
	A	.075	.0075	.0825	.0082
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.072 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression .027 inch.
(1) Values for 4 ohm winding.
(2) Values for 500 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	DX-13	8	C-9242-3	160576

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 500 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 470E

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	15.00			
	A	.030			
Min. drop-away without contact pressure	V	.75			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.75		4.13	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.072 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression .027 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	DX-13	8	C-9242-3	158831

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms 500 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 471

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.60			
	A	.0532			
Min. drop-away without contact pressure	V	2.00			
	A	.004			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.65		7.30	
	A	.0133		.0146	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-20	15

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms	___F	___B	___N	___R
	500 ohms	8 FB		___NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 472A

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.00			
	A	.060			
Min. drop-away without contact pressure	V	2.00			
	A	.004			
Min. drop-away	V	3.30		2.30	
	A	.0066		.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.50		8.25	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-24
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-23	15

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms	___F	___B	___N	___R
	500 ohms	8 FB		___NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 472B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.00			
	A	.040			
Min. drop-away without contact pressure	V	.750			
	A	.0015			
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V	5.00	6.25	5.50	
	A	.010	.0125	.011	
Max. working	V	6.50		7.15	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms	___F	___B	___N	___R
	500 ohms	8 FB		___NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 473

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.60			
	A	.0372			
Min. drop-away without contact pressure	V	1.35			
	A	.0027			
Min. drop-away	V	2.30		1.60	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.65		5.10	
	A	.0093		.0102	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-46	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms 500 ohms ______ ohms	______ F	______ B	______ N	______ R
			8 FB		______ NR

DATE 7-15-1944 TABLE NO. 474

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	23.85	1.25	
	A	.312	.0356	.312	
Min. drop-away without contact pressure	V	.088	1.67		
	A	.022	.0025		
Min. drop-away	V	.148	2.81	.120	1.94
	A	.037	.0042	.030	.0029
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	5.96	.343	6.56
	A	.075	.0089	.0858	.0098
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 670 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8		

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 670 ohms ______ ohms	______ F	______ B	______ N	______ R
			8 FB		______ NR

DATE 7-15-1944 TABLE NO. 476A

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	23.05	1.20	
	A	.312	.0344	.300	
Min. drop-away without contact pressure	V	.088	1.67		
	A	.022	.0025		
Min. drop-away	V	.148	2.81	.120	1.94
	A	.037	.0042	.030	.0029
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.312	5.76	.343	6.37
	A	.078	.0086	.0858	.0095
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 670 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-28	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 670 ohms ______ ohms	______ F	______ B	______ N	______ R
			8 FB		______ NR

DATE 7-15-1944 TABLE NO. 476B

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.25	32.20	1.25	
	A	.312	.048	.312	
Min. drop-away without contact pressure	V	.060	.938		
	A	.015	.0014		
Min. drop-away	V	.148	2.01	.108	1.41
	A	.037	.003	.027	.0021
Min. pick-up	V				
	A				
Max. pick-up	V	.312	4.69	.343	5.16
	A	.078	.007	.0858	.0077
Max. working	V	.480	8.04	.528	8.84
	A	.120	.012	.132	.0132
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:
(1) Values for 4 ohm winding.
(2) Values for 670 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms	____ F	____ B	____ N	____ R
	670 ohms				
	____ ohms	8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 476C

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	1.33	25.46	1.33	
	A	.332	.038	.332	
Min. drop-away without contact pressure	V	.088	1.67		
	A	.022	.0025		
Min. drop-away	V	1.48	2.81	.120	1.94
	A	.037	.0042	.030	.0029
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.332	6.37	.365	7.04
	A	.083	.0095	.0913	.105
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-5 Indiv. ED 28623-24
Remarks: Heavy duty back contacts.
(1) 4 ohm values.
(2) 670 ohm values.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-55	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms	____ F	____ B	____ N	____ R
	670 ohms				
	____ ohms	8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 476D

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.46			
	A	.038			
Min. drop-away without contact pressure	V	1.67			
	A	.0025			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.37		7.04	
	A	.0095		.105	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-24
Remarks: Heavy duty back contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-55	8

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	670 ohms	____ F	____ B	____ N	____ R
	670 ohms				
	____ ohms	8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 477

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.05			
	A	.0344			
Min. drop-away without contact pressure	V	1.67			
	A	.0025			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.76		6.37	
	A	.0086		.0095	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-20	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	670 ohms 670 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 478A

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.85			
	A	.0356			
Min. drop-away without contact pressure	V	1.67			
	A	.0025			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.96		6.56	
	A	.0089		.0098	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to SG	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-23
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-33	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	670 ohms 670 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 478B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	32.2			
	A	.048			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	2.01		1.41	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V	4.69	6.03	5.16	
	A	.007	.009	.0077	
Max. working	V	8.04		8.84	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.062 in.
B ____ to ____	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	670 ohms 670 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 40 to 45 at 5.4 to 6.9 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.045 in.	1.5 oz.	.020 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	2.4	6.9	5.4
Amps.	.013	.037	.029

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-32	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	185 ohms 185 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 488A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 40 to 45 at 5.4 to 6.9 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SP to S	.045 in.	1.5 oz.	.020 in.
B S to SP	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	2.4	6.9	5.4
Amps.	.013	.037	.029

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-34	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	185 ohms 185 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 488B

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute 40 to 45 at 6.8 to 8.0 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036* in.	oz.	.018 in.
B to	XXXX	XXXX	.054 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 3151 Indiv. ______
Remarks: *Note- For lamp contacts.

	Maximum Starting energy	Maximum Working	Minimum Working
Volts	4.5	8.0	6.0
Amps.	.0225	.040	.030

Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S. Co.	FN-16	8	C-9357-6	104135

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	200 ohms 200 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 489

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.00			
	A	.100			
Min. drop-away without contact pressure	V	.600			
	A	.003			
Min. drop-away	V	1.00		.700	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V	5.00	6.24	5.50	
	A	.025	.0312	.0275	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 40 at 5 to 7 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Two armature type.

	Maximum Working	Minimum Working
Volts	7.0	5.0
Amps.	.035	.025

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
FLASHER	200 ohms 200 ohms ______ ohms	______ F	______ B	______ N	______ R
		______ FB		______ NR	

DATE 7-15-1944 TABLE NO. 490

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.0	8.0		
	A	.04	.04		
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 6 to 8 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

	Maximum Working	Minimum Working
Volts	8.0	6.0
Amps.	.04	.03

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
W.R.R.S.	4000			

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
FLASHER	200 ohms 200 ohms ______ ohms	______ F	______ B	______ N	______ R
		______ FB		______ NR	

DATE 7-15-1944 TABLE NO. 491

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 40 to 45 at 6.4 to 9.2 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.045 in.	1.5 oz.	.020 in.
B S to S	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	3.12	9.36	6.50
Amps.	.012	.036	.025

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53004-32	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	260 ohms 260 ohms ______ ohms	______ F	______ B	______ N	______ R
		4 FB		______ NR	

DATE 7-15-1944 TABLE NO. 495A

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

D. C. RELAYS

4-30-1941
7-15-1944

NYGS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 40 to 45 at 6.4 to 9.2 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SP to S	.045 in.	1.5 oz.	.020 in.
B S to SP	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	3.12	9.36	6.50
Amps.	.012	.036	.025

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53004-34	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	260 ohms 260 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 495B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 30 to 45 at 5.4 to 6.9 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036 in.	1.5 oz.	.015 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. Indiv. 10M-77
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	4.5	6.9	5.1
Amps.	.015	.023	.017

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G. R. S. Co.	K	8	53004-25	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	300 ohms 300 ohms ohms	F	B	N	R
		4 FB		NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.0			
	A	.060			
Min. drop-away without contact pressure	V	.450			
	A	.0015			
Min. drop-away	V	1.05		.750	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	4.50	5.40	4.95	
	A	.015	.018	.0165	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 30 to 45 at 5 to 7 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B to	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. Indiv.
Remarks: Two armature type.

	Maximum Working	Minimum Working
Volts	6.9	5.1
Amps.	.023	.017

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
		8		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
FLASHER	300 ohms 300 ohms ohms	F	B	N	R
		4 FB		NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral 006-009 in., Polar ____ in.
Flashes per minute 30 to 40 at 6 to 8 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.020 in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 1706 Indiv. 1706A
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	5.0	8.0	6.0
Amps.	.0143	.0228	.0174

Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	NF	2	C-9027-2	125344

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	350 ohms 350 ohms ____ ohms	____ F	____ B	____ N	____ R
		____ FB		2 NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral 010-018 in., Polar ____ in.
Flashes per minute 30 to 40 at 9 to 11.5 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	.020 in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. 1706 Indiv. ____
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	7.5	12.0	9.0
Amps.	.0183	.030	.0225

Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	NF-2	2	C-9027-5	183642

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	400 ohms 400 ohms ____ ohms	____ F	____ B	____ N	____ R
		____ FB		2 NR	

DATE 7-15-1944 TABLE NO. 507

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 40 to 45 at 9 to 11.5 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.015 in.	1.5 oz.	.020 in.
B S to S	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	4.0	11.6	9.0
Amps.	.010	.029	.0225

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53004-32	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	400 ohms 400 ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 7-15-1944 TABLE NO. 508A

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SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 40 to 45 at 9 to 11.5 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SP to S	.045 in.	1.5 oz.	.020 in.
B S to SP	XXXX	XXXX	. in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-137
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	4.0	11.6	9.0
Amps.	.010	.029	.0225

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53004-34	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	400 ohms 400 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 508B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	32.0			
	A	.080			
Min. drop-away without contact pressure	V	1.00			
	A	.0025			
Min. drop-away	V	1.20		.840	
	A	.003		.0021	
Min. pick-up	V				
	A				
Max. pick-up	V	8.0	10.0	8.80	
	A	.020	.025	.022	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 8 to 12 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B to	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Two armature type.

	Maximum Working	Minimum Working
Volts	12.0	8.0
Amps.	.030	.020

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
FLASHER	400 ohms 400 ohms ohms	F	B	N	R
		FB		4 NR	

DATE 7-15-1944 TABLE NO. 509

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 6.8 to 9.4 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036 in.	1.5 oz.	.015 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-77
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	5.85	9.45	6.75
Amps.	.013	.021	.015

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53004-25	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	450 ohms 450 ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 514

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute 40 to 45 at 9 to 11.5 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036* in.	oz.	.018 in.
B to	XXXX	XXXX	.054 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 5 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 3151 Indiv. ____
Remarks: *For lamp contacts.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	6.8	12.0	8.5
Amps.	.0136	.024	.017

Rated at 10 to 12 volts. Arm End Play .010" to .015"

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	FN-16	4	C-9357-6	104134

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	500 ohms 500 ohms ohms	F	B	N	R
			FB	4 NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 30 to 45 at 8.4 to 11.7 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036 in.	1.5 oz.	.015 in.
B to	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-77
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	7.8	12.0	8.4
Amps.	.013	.02	.014

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53004-25	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	600 ohms 600 ohms ohms	F	B	N	R
		4 FB	NR		

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute 100 to 110 at 8.8 to 11 volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036 in.	1.5 oz.	.015 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	5.28	7.26	5.28
Amps.	.0088	.0110	.0088

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-21	1

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	600 ohms 600 ohms ohms	F	B	N	R
		2 FB	NR		

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 5.4 to 8.0 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.050 in.	1.875 oz.	.020 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-117
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	4.55	7.8	5.85
Amps.	.007	.012	.009

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-27	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	650 ohms 650 ohms ohms	F	B	N	R
		4 FB		NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 7.2 to 11.5 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.050 in.	1.875 oz.	.020 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-117
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	6.45	10.5	7.50
Amps.	.0086	.014	.001

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-27	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	750 ohms 750 ohms ohms	F	B	N	R
		4 FB		NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 30 to 45 at 10 to 14 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.036 in.	1.5 oz.	.015 in.
B S to S	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-77
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	8.8	14.4	10.4
Amps.	.011	.018	.013

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53004-25	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	800 ohms 800 ohms ohms	F	B	N	R
		4 FB		NR	

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral 006-012 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	X X X X	X X X X	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 1706 Indiv. 1706A
Remarks: One armature type.

	Maximum Starting Energy	Maximum Working	Minimum Working
Volts	7.5	12.0	9.0
Amps.	.0094	.015	.0113

Armature end play .010 to .015 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	NF	2	C-9027-2	125345

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
FLASHER	800 ohms	____ F	____ B	____ N	____ R
	800 ohms		____ FB		2 NR
	____ ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.267		.240	
	A	.066		.060	
Max. pick-up	V	.280	.322		
	A	.070	.081		
Max. working	V	.420	.420	.462	.462
	A	.105	.105	.1155	.1155
Max. polar pick-up and working	V	.180	.180	.198	.198
	A	.045	.045	.0495	.0495

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at .56 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	X X X X	X X X X	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts- .016 inch. Polar contacts- .038 inch.
End play of polar armature- .004 to .007 inch.
*.050 inch minimum and .070 inch nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	6	C-9270-4	159902

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	4 ohms	____ F	____ B	____ N	____ R
	____ ohms		4 FB		2 NR
	____ ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.42		1.42	
	A	.356		.356	
Min. drop-away without contact pressure	V	.084			
	A	.021			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.264			
	A	.066			
Max. pick-up	V				
	A				
Max. working	V	.356	.356	.392	.392
	A	.089	.089	.0979	.0979
Max. polar pick-up and working	V	.172	.172	.189	.189
	A	.043	.043	.0473	.0473

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 2 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P SIC to S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-123	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms		4 FB		2 NR
	____ ohms				

DATE 7-15-1944 TABLE NO. 545A

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.42		1.42	
	A	.356		.356	
Min. drop-away without contact pressure	V	.084			
	A	.021			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.264			
	A	.066			
Max. pick-up	V				
	A				
Max. working	V	.356	.356	.392	.392
	A	.089	.089	.0979	.0979
Max. polar pick-up and working	V	.172	.172	.189	.189
	A	.043	.043	.0473	.0473

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 2 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-118	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ohms ohms	F	B	N	R
		4 FB		2 NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.12		1.12	
	A	.280		.280	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.264		.240	
	A	.066		.060	
Max. pick-up	V	.280	.322		
	A	.070	.081		
Max. working	V	.420	.420	.462	.462
	A	.105	.105	.1155	.1155
Max. polar pick-up and working	V	.180	.180	.198	.198
	A	.045	.045	.0495	.0495

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at .56 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts- .016 inch. Polar contacts- .038 inch. End play of polar armature .004 to .007 inch. *.050 inch minimum and .070 inch nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	6	C-9270-4	166157

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ohms ohms	2 F	B	N	R
		2 FB		2 NR	

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.17		1.17	
	A	.292		.292	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.132		.096	
	A	.033		.024	
Min. pick-up	V				
	A				
Max. pick-up	V	.292	.364		
	A	.073	.091		
Max. working	V	.480	.560	.528	.616
	A	.120	.140	.132	.154
Max. polar pick-up and working	V	.248	.308	.272	.340
	A	.062	.077	.068	.085

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	in.	oz.	in.
B ______ to ______	XXXX	XXXX	in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	Mod 9E	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ohms ohms	F	B	N	R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 547A

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.17		1.17	
	A	.292		.292	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.132		.096	
	A	.033		.024	
Min. pick-up	V				
	A				
Max. pick-up	V	.292	.364		
	A	.073	.091		
Max. working	V	.480	.560	.528	.616
	A	.120	.140	.132	.154
Max. polar pick-up and working	V	.248	.308	.272	.340
	A	.062	.077	.068	.085

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	X X X X	X X X X	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 12	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
			4 FB		2 NR

DATE 7-15-1944 TABLE NO. 547B

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.66		1.66	
	A	.416		.416	
Min. drop-away without contact pressure	V	.100			
	A	.025			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.320			
	A	.080			
Max. pick-up	V				
	A				
Max. working	V	.416	.416	.456	.456
	A	.104	.104	.114	.114
Max. polar pick-up and working	V	.208	.208	.229	.229
	A	.052	.052	.0572	.0572

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 2 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: Neutral contacts connected internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53002-111	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
			4 FB		4 NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.66		1.66	
	A	.416		.416	
Min. drop-away without contact pressure	V	.100			
	A	.025			
Min. drop-away	V	.176		.144	
	A	.044		.036	
Min. pick-up	V	.320			
	A	.080			
Max. pick-up	V				
	A				
Max. working	V	.416	.416	.456	.456
	A	.104	.104	.114	.114
Max. polar pick-up and working	V	.208	.208	.229	.229
	A	.052	.052	.0572	.0572

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 2 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	X X X X	X X X X	.020 in.
P S to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53002-112	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms ______ ohms ______ ohms	______ F	______ B	______ N	______ R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 550

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.20			
	A	.300			
Min. drop-away without contact pressure	V	.600			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V	.284			
	A	.071			
Max. pick-up	V	.300			
	A	.075			
Max. working	V	.440	.440	.484	.484
	A	.110	.110	.121	.121
Max. polar pick-up and working	V	.200	.200	.220	.220
	A	.050	.050	.055	.055

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at .56 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.019 in.	1.75 oz.	.050* in.
B	S	to	S	XXXX	XXXX	.030 in.
P	SIC	to	S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts-
.016 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270-11	188963

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	4 ohms	F	B	N	R
	ohms				
	ohms	4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 551

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.34		1.34	
	A	.268		.268	
Min. drop-away without contact pressure	V	.070			
	A	.014			
Min. drop-away	V	.150		.108	
	A	.030		.0216	
Min. pick-up	V				
	A				
Max. pick-up	V	.335	.420	.367	
	A	.067	.084	.0737	
Max. working	V	.580	.580	.640	.640
	A	.116	.116	.128	.128
Max. polar pick-up and working	V	.285	.285	.314	.314
	A	.057	.057	.0627	.0627

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F		to		in.	oz.	in.
B		to		XXXX	XXXX	in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working
should not exceed 85% of actual pick-up
of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		4		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	5 ohms	F	B	N	R
	ohms				
	ohms	FB		4 NR	

DATE 7-15-1944 TABLE NO. 552

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	3.39		3.39	
	A	.212		.212	
Min. drop-away without contact pressure	V	.192			
	A	.012			
Min. drop-away	V	.352		.288	
	A	.022		.018	
Min. pick-up	V	.640			
	A	.040			
Max. pick-up	V				
	A				
Max. working	V	.848	.848	.933	.933
	A	.053	.053	.0583	.0583
Max. polar pick-up and working	V	.416	.416	.458	.458
	A	.026	.026	.0286	.0286

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 2 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	5

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	16 ohms	F	B	N	R
	ohms				
	ohms	4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 556

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.37		2.37	
	A	.148		.148	
Min. drop-away without contact pressure	V	.115			
	A	.0072			
Min. drop-away	V	.288		.236	
	A	.018		.0148	
Min. pick-up	V	.560			
	A	.035			
Max. pick-up	V	.592			
	A	.037			
Max. working	V	.864	.864	.950	.950
	A	.054	.054	.0594	.0594
Max. polar pick-up and working	V	.392	.392	.431	.431
	A	.0245	.0245	.027	.027

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 1.1 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts- .016 inch, Polar contacts- .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	16 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 557

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.80		6.80	
	A	.136		.136	
Min. drop-away without contact pressure	V	.400			
	A	.008			
Min. drop-away	V	.700		.490	
	A	.014		.0098	
Min. pick-up	V	1.30			
	A	.026			
Max. pick-up	V				
	A				
Max. working	V	1.70	1.70	1.87	1.87
	A	.034	.034	.0374	.0374
Max. polar pick-up and working	V	.830	.830	.915	.915
	A	.0166	.0166	.0183	.0183

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 4 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	6

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	50 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 560

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.92			
	A	.0992			
Min. drop-away without contact pressure	V	.600			
	A	.006			
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V	1.90			
	A	.019			
Max. pick-up	V				
	A				
Max. working	V	2.48	2.48	2.73	2.73
	A	.0248	.0248	.0273	.0273
Max. polar pick-up and working	V	1.24	1.24	1.36	1.36
	A	.0124	.0124	.0136	.0136

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 4 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	100 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 570

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.00			
	A	.100			
Min. drop-away without contact pressure	V	.500			
	A	.005			
Min. drop-away	V	.950		.670	
	A	.0095		.0067	
Min. pick-up	V	1.68			
	A	.0168			
Max. pick-up	V				
	A				
Max. working	V	2.50	2.50	2.75	2.75
	A	.025	.025	.0275	.0275
Max. polar pick-up and working	V	.840	.840	.920	.920
	A	.0084	.0084	.0092	.0092

Min. physical air gap; Neutral .013 in., Polar .012 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 4 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	C	to	SG	.015 in.	1.625 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	C	to	SG	.034 in.	1.625 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 10M-63
Remarks: Small magnets.
Neutral contacts connected internally
to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53002-83	7

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	100 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		4 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 571

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.84			
	A	.592			
Min. drop-away without contact pressure	V	.700			
	A	.0035			
Min. drop-away	V	1.22		.860	
	A	.0061		.0043	
Min. pick-up	V	2.20			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	2.96	2.96	3.26	3.26
	A	.0148	.0148	.0163	.0163
Max. polar pick-up and working	V	1.44	1.44	1.58	1.58
	A	.0072	.0072	.0079	.0079

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.625 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.045* in.	1.625 oz.	.050 in.

Contact cap'y (Non-ind. load) ______ amps. at ______ volts (Par. ______)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured
at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	6	53002-114	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		2 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 580A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	12.00			
	A	.060			
Min. drop-away without contact pressure	V	.700			
	A	.0035			
Min. drop-away	V	1.22		.860	
	A	.0061		.0043	
Min. pick-up	V	2.20			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	3.00	3.00	3.30	3.30
	A	.015	.015	.0165	.0165
Max. polar pick-up and working	V	1.44	1.44	1.80	1.80
	A	.0072	.0072	.009	.009

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured
at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	6	53002-118	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		2 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 580B

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

4-30-1941
7-15-1944

D. C. RELAYS

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	12.00			
	A	.060			
Min. drop-away without contact pressure	V	.700			
	A	.0035			
Min. drop-away	V	1.22		.860	
	A	.0061		.0043	
Min. pick-up	V	2.20			
	A	.011			
Max. pick-up	V				
	A				
Max. working	V	3.00	3.00	3.30	3.30
	A	.015	.015	.0165	.0165
Max. polar pick-up and working	V	1.44	1.44	1.80	1.80
	A	.0072	.0072	.009	.009

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.015 in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	6	53002-123	10

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 580C

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.60			
	A	.0528			
Min. drop-away without contact pressure	V	.500			
	A	.0025			
Min. drop-away	V	1.14		.800	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V	2.64	3.20	2.90	3.52
	A	.0132	.016	.0145	.0176
Max. working	V	4.36	4.36	4.80	4.80
	A	.0218	.0218	.024	.024
Max. polar pick-up and working	V	2.24	2.24	2.46	2.46
	A	.0112	.0112	.0123	.0123

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	to		in.	oz.	in.
B	to		XXXX	XXXX	in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 581

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F C	to	SG	.015 in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P C	to	SG	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53002-64	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 585

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53002-112	9

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4	FB	4	NR

DATE 7-15-1944 TABLE NO. 586A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.80			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.60	3.60	3.96	3.96
	A	.018	.018	.0198	.0198
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53002-112	9A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4	FB	4	NR

DATE 7-15-1944 TABLE NO. 586B

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 10 volts (Par. ___)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: Neutral contacts connected internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53002-111	9

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4	FB	4	NR

DATE 7-15-1944 TABLE NO. 587A

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.60	3.60	3.96	3.96
	A	.018	.018	.0198	.0198
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: Neutral contact connected internally to polar contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-111	9A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 587B

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.40			
	A	.052			
Min. drop-away without contact pressure	V	.520			
	A	.0026			
Min. drop-away	V	1.26		.822	
	A	.0063		.0041	
Min. pick-up	V	2.46			
	A	.0123			
Max. pick-up	V	2.60	3.00		
	A	.013	.015		
Max. working	V	3.80	3.80	4.18	4.18
	A	.019	.019	.0209	.0209
Max. polar pick-up and working	V	1.72	1.72	1.89	1.89
	A	.0086	.0086	.0095	.0095

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 4.83 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ____
Remarks: Minimum compression; Neutral contacts- .016 inch, polar contacts .038 inch.
End play of polar armature .004 to .007 inch
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 588

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.40			
	A	.052			
Min. drop-away without contact pressure	V	1.35			
	A	.003			
Min. drop-away	V	2.39		1.66	
	A	.0053		.0037	
Min. pick-up	V	4.50			
	A	.010			
Max. pick-up	V				
	A				
Max. working	V	5.85	5.85	6.44	6.44
	A	.013	.013	.0143	.0143
Max. polar pick-up and working	V	2.88	2.88	3.15	3.15
	A	.0064	.0064	.007	.007

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 10 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	13

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	450 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 590

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	14.0			
	A	.028			
Min. drop-away without contact pressure	V	.74			
	A	.0015			
Min. drop-away	V	1.80		1.30	
	A	.0037		.0026	
Min. pick-up	V	3.33			
	A	.0067			
Max. pick-up	V	3.50			
	A	.007			
Max. working	V	5.25	5.25	5.78	5.78
	A	.0105	.0105	.0116	.0116
Max. polar pick-up and working	V	2.25	2.25	2.48	2.48
	A	.0045	.0045	.0049	.0049

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 7 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts- .016 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	6	C-9270-4	159140

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		2 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 600

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.00			
	A	.036			
Min. drop-away without contact pressure	V	.800			
	A	.0016			
Min. drop-away	V	1.80		1.25	
	A	.0036		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	4.50	6.00	4.95	6.60
	A	.009	.012	.0099	.0132
Max. working	V	8.50	8.50	9.35	9.35
	A	.017	.017	.0187	.0187
Max. polar pick-up and working	V	3.80	3.80	4.20	4.20
	A	.0076	.0076	.0084	.0084

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		2 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 601

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	38.00			
	A	.076			
Min. drop-away without contact pressure	V	2.25			
	A	.0045			
Min. drop-away	V	3.95		2.75	
	A	.0079		.0055	
Min. pick-up	V	7.00			
	A	.014			
Max. pick-up	V				
	A				
Max. working	V	9.50	9.50	10.45	10.45
	A	.019	.019	.0209	.0209
Max. polar pick-up and working	V	4.65	4.65	5.00	5.00
	A	.0093	.0093	.001	.001

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 602

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	36.60			
	A	.0732			
Min. drop-away without contact pressure	V	1.85			
	A	.0037			
Min. drop-away	V	3.55		2.50	
	A	.0071		.005	
Min. pick-up	V	6.40			
	A	.0128			
Max. pick-up	V				
	A				
Max. working	V	9.15	9.15	10.05	10.05
	A	.0183	.0183	.0201	.0201
Max. polar pick-up and working	V	3.15	3.15	3.45	3.45
	A	.0063	.0063	.0069	.0069

Min. physical air gap; Neutral .013 in., Polar .012 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	C	to	SG	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	C	to	SG	.034 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 10M-63
Remarks: Small magnets.
Neutral contacts connected internally
to Polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-83	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms ohms ohms	___ F	___ B	___ N	___ R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 603

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	15.0			
	A	.030			
Min. drop-away without contact pressure	V	.74			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V	3.56			
	A	.0071			
Max. pick-up	V	3.75			
	A	.0075			
Max. working	V	5.50	5.50	6.05	6.05
	A	.011	.011	.0121	.0121
Max. polar pick-up and working	V	2.50	2.50	2.75	2.75
	A	.005	.005	.0055	.0055

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 7 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.019 in.	1.75 oz.	.050* in.
B	S	to	S	XXXX	XXXX	.030 in.
P	SIC	to	S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts-
.016 inch, Polar contacts- .038 inch.
End play of polar armature .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270-6	170121

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms ohms ohms	___ F	___ B	___ N	___ R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 604

INSTRUCTION

D. C. RELAY REQU

OPERATING CHARACTERISTICS		MANUFACTUR			
		Normal	Reverse		
Initial charge	V	27.20			
	A	.0404			
Min. drop-away without contact pressure	V	1.61			
	A	.0024			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	5.09			
	A	.0076			
Max. pick-up	V				
	A				
Max. working	V	6.77	6.77	7.44	7.44
	A	.0101	.0101	.0111	.0111
Max. polar pick-up and working	V	3.28	3.28	3.62	3.62
	A	.0049	.0049	.0054	.0054

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured
at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	6	53002-123	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	___ F	___ B	___ N	___ R
			4 FB		2 NR

DATE 7-15-1944 TABLE NO. 610A

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.20			
	A	.0404			
Min. drop-away without contact pressure	V	1.61			
	A	.0024			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	5.09			
	A	.0076			
Max. pick-up	V				
	A				
Max. working	V	6.77	6.77	7.44	7.44
	A	.0101	.0101	.0111	.0111
Max. polar pick-up and working	V	3.28	3.28	3.62	3.62
	A	.0049	.0049	.0054	.0054

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.015 in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	SIC to	S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-118	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 2 NR	R

DATE 7-15-1944 TABLE NO. 610B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.20			
	A	.0404			
Min. drop-away without contact pressure	V	1.61			
	A	.0024			
Min. drop-away	V	2.81		1.94	
	A	.0042		.0029	
Min. pick-up	V	5.09			
	A	.0076			
Max. pick-up	V				
	A				
Max. working	V	6.77	6.77	7.44	7.44
	A	.0101	.0101	.0111	.0111
Max. polar pick-up and working	V	3.28	3.28	3.62	3.62
	A	.0049	.0049	.0054	.0054

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.015 in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	SIC to	S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-106	17

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 2 NR	R

DATE 7-15-1944 TABLE NO. 610C

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.20			
	A	.0256			
Min. drop-away without contact pressure	V	.90			
	A	.0013			
Min. drop-away	V	2.25		1.575	
	A	.0034		.0023	
Min. pick-up	V	4.05		3.62	
	A	.006		.0054	
Max. pick-up	V	4.26	4.89		
	A	.0064	.0073		
Max. working	V	6.39	6.39	7.03	7.03
	A	.0095	.0095	.0105	.0105
Max. polar pick-up and working	V	2.75	2.75	3.025	3.025
	A	.0041	.0041	.0045	.0045

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 8.5 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.019 in.	1.75 oz.	.050* in.
B	S to	S	XXXX	XXXX	.030 in.
P	SIC to	S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts-.016 inch. Polar contacts-.038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	6	C-9270-4	159544

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 2 NR	R

DATE 7-15-1944 TABLE NO. 611

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SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.70			
	A	.0264			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	1.94		1.34	
	A	.0029		.002	
Min. pick-up	V				
	A				
Max. pick-up	V	4.42		4.89	
	A	.0066		.0073	
Max. working	V	7.34	8.44	8.11	9.32
	A	.011	.0126	.0121	.0139
Max. polar pick-up and working	V	3.75	3.75	4.15	4.15
	A	.0056	.0056	.0062	.0062

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	Mod 9E	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 612A

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.70			
	A	.0264			
Min. drop-away without contact pressure	V	.938			
	A	.0014			
Min. drop-away	V	1.94		1.34	
	A	.0029		.002	
Min. pick-up	V				
	A				
Max. pick-up	V	4.42		4.89	
	A	.0066		.0073	
Max. working	V	7.34	8.34	8.11	9.32
	A	.011	.0126	.0121	.0139
Max. polar pick-up and working	V	3.75	3.75	4.15	4.15
	A	.0056	.0056	.0062	.0062

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	Mod 12	6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 612B

NYCS
SC-48

INSTRUCTIONS 390
D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	32.16			
	A	.048			
Min. drop-away without contact pressure	V	1.875			
	A	.0028			
Min. drop-away	V	3.35		2.34	
	A	.005		.0035	
Min. pick-up	V	6.03			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	8.04	8.04	8.84	8.84
	A	.012	.012	.0132	.0132
Max. polar pick-up and working	V	3.95	3.95	4.36	4.36
	A	.0059	.0059	.0065	.0065

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	14

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 615A

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
390B
4-30-1941
7-15-1944

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	32.70			
	A	.0488			
Min. drop-away without contact pressure	V	1.875			
	A	.0028			
Min. drop-away	V	3.35		2.34	
	A	.005		.0035	
Min. pick-up	V	6.03			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	8.17	8.17	8.99	8.99
	A	.0122	.0122	.0134	.0134
Max. polar pick-up and working	V	3.95	3.95	4.36	4.36
	A	.0059	.0059	.0064	.0064

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	14A

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 4 NR	R

DATE 7-15-1944 TABLE NO. 615B

NYCS
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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.20			
	A	.0272			
Min. drop-away without contact pressure	V	.90			
	A	.0013			
Min. drop-away	V	2.25			
	A	.0034			
Min. pick-up	V	4.34			
	A	.0065			
Max. pick-up	V	4.56	5.24		
	A	.0068	.0078		
Max. working	V	6.70	6.70	7.37	7.37
	A	.010	.010	.011	.011
Max. polar pick-up and working	V	3.05	3.05	3.35	3.35
	A	.0046	.0046	.005	.005

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 8.5 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv.
Remarks: Minimum compression; Neutral contacts-.016 inch. Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270-6	163685

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 4 NR	R

DATE 7-15-1944 TABLE NO. 616

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V	1.54			
	A	.0023			
Min. drop-away	V	3.02		2.14	
	A	.0045		.0032	
Min. pick-up	V	5.36			
	A	.008			
Max. pick-up	V				
	A				
Max. working	V	6.77	6.77	6.74	6.74
	A	.011	.011	.0111	.0111
Max. polar pick-up and working	V	3.28	3.28	3.62	3.62
	A	.0049	.0049	.0054	.0054

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to G	.016 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P C to S	.034 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. ______ Indiv. ED 28623-12
Remarks: Neutral contacts connected internally to polar contacts.
High voltage neutral contacts and heavy duty polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-87	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	670 ohms ohms ohms	F 4 FB	B	N 2 NR	R

DATE 7-15-1944 TABLE NO. 617

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 390B
D. C. RELAYS
4-30-1941
7-15-1944

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.0368			
Min. drop-away without contact pressure	V	1.65			
	A	.0022			
Min. drop-away	V	2.85		2.06	
	A	.0038		.0027	
Min. pick-up	V	4.80			
	A	.0064			
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.58	7.58
	A	.0092	.0092	.0101	.0101
Max. polar pick-up and working	V	3.38	3.38	3.75	3.75
	A	.0045	.0045	.005	.005

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-114	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	750 ohms	F	B	N	R
	ohms				
	ohms	4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 620A

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.0368			
Min. drop-away without contact pressure	V	1.65			
	A	.0022			
Min. drop-away	V	2.85		2.06	
	A	.0038		.0027	
Min. pick-up	V	4.80			
	A	.0064			
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.58	7.58
	A	.0092	.0092	.0101	.0101
Max. polar pick-up and working	V	3.38	3.38	3.75	3.75
	A	.0045	.0045	.005	.005

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-118	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	750 ohms	F	B	N	R
	ohms				
	ohms	4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 620B

NYCS SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.0368			
Min. drop-away without contact pressure	V	1.65			
	A	.0022			
Min. drop-away	V	2.85		2.06	
	A	.0038		.0027	
Min. pick-up	V	4.80			
	A	.0064			
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.58	7.58
	A	.0092	.0092	.0101	.0101
Max. polar pick-up and working	V	3.38	3.38	3.75	3.75
	A	.0045	.0045	.005	.005

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .9 sec. at 12 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.040* in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-26
Remarks: *Polar contact compression measured at contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	6	53002-123	18

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	750 ohms	F	B	N	R
	ohms				
	ohms	4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 620C

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.20			
	A	.0212			
Min. drop-away without contact pressure	V	1.11			
	A	.0011			
Min. drop-away	V	2.78		2.00	
	A	.0028		.002	
Min. pick-up	V	5.0			
	A	.005			
Max. pick-up	V	5.26			
	A	~~.0065~~ .0053			
Max. working	V	7.89	7.89	8.70	8.70
	A	.0079	.0079	.0087	.0087
Max. polar pick-up and working	V	3.38	3.38	3.72	3.72
	A	.0034	.0034	.0037	.0037

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 10.5 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts- .016 inch. Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	6	C-9270-4	166443

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	1000 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 630

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.20			
	A	.0212			
Min. drop-away without contact pressure	V	1.10			
	A	.0011			
Min. drop-away	V	2.40		1.70	
	A	.0024		.0017	
Min. pick-up	V				
	A				
Max. pick-up	V	5.30	6.60	6.00	7.50
	A	.0053	.0066	.006	.0075
Max. working	V	10.00	10.00	11.00	11.00
	A	.010	.010	.011	.011
Max. polar pick-up and working	V	4.50	4.50	5.10	5.10
	A	.0045	.0045	.0051	.0051

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ___ to ___	___ in.	___ oz.	___ in.
B ___ to ___	XXXX	XXXX	___ in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: Maximum polar pick-up and working should not exceed 85% of actual pick-up of the neutral armature.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
		6		

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	1000 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		2 NR	

DATE 7-15-1944 TABLE NO. 631

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.00			
	A	.036			
Min. drop-away without contact pressure	V	2.10			
	A	.0021			
Min. drop-away	V	3.70		2.60	
	A	.0037		.0026	
Min. pick-up	V	6.80			
	A	.0068			
Max. pick-up	V				
	A				
Max. working	V	9.00	9.00	9.90	9.90
	A	.009	.009	.0099	.0099
Max. polar pick-up and working	V	4.40	4.40	4.80	4.80
	A	.0044	.0044	.0048	.0048

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 14 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.034 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	16

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	1000 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 632

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.4			
	A	.0224			
Min. drop-away without contact pressure	V	1.11			
	A	.0011			
Min. drop-away	V	2.78		2.00	
	A	.0028		.002	
Min. pick-up	V	5.36			
	A	.0054			
Max. pick-up	V	5.64			
	A	.0056			
Max. working	V	8.26	8.26	9.086	9.086
	A	.0083	.0083	.009	.009
Max. polar pick-up and working	V	3.76	3.76	4.14	4.14
	A	.0038	.0038	.0041	.0041

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 10.5 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.019 in.	1.75 oz.	.050* in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. ______
Remarks: Minimum compression; Neutral contacts-
.016 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270-6	163686

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	1000 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. 633

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.10			
	A	.086			
Min. drop-away without contact pressure	V	1.31			
	A	.0047			
Min. drop-away	V	3.28		2.30	
	A	.0117		.0082	
Min. pick-up	V	5.29			
	A	.0189			
Max. pick-up	V	6.02			
	A	.0215			
Max. working	V	6.02	6.02	6.622	6.622
	A	.0215	.0215	.0236	.0236
Max. polar pick-up and working	V	3.70	3.70	4.07	4.07
	A	.0132	.0132	.0145	.0145

Min. physical air gap; Neutral .013 in., Polar .017 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S**	.029 in.	3.5* oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC*** to S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 20 amps. at 150 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. 2378K
Remarks: Minimum compression; Neutral contacts-
.025 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
* Magnetic blowout contact.
** Silver alloy for magnetic blowout contact.
*** Silver for switch control contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-25	10	C-9270-32	232930

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SWITCH CONTROL	280 ohms	1 F	B	N	R
	ohms	2 FB		4 NR	
	ohms				

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	48.0			
	A	.048			
Min. drop-away without contact pressure	V	2.60			
	A	.0026			
Min. drop-away	V	6.50		4.50	
	A	.0065		.0045	
Min. pick-up	V	10.50			
	A	.0105			
Max. pick-up	V	12.0			
	A	.012			
Max. working	V	12.0	12.0	13.20	13.20
	A	.012	.012	.0132	.0132
Max. polar pick-up and working	V	7.4	7.4	8.14	8.14
	A	.0074	.0074	.0081	.0081

Min. physical air gap; Neutral .013 in., Polar .017 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S**	.029 in.	3.5 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.043 in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 20* amps. at 150 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. 2378K
Remarks: Minimum compression; Neutral contacts-
.025 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
* Magnetic blowout contact.
** Silver alloy for magnetic blowout contact.
*** Silver for switch control contact.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-25	10	C-9270-32	232933

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SWITCH CONTROL	1000 ohms	1 F	B	N	R
	ohms	2 FB		4 NR	
	ohms				

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	3.20		3.20	
	A	.200		.200	
Min. drop-away without contact pressure	V	.192			
	A	.012			
Min. drop-away	V	.352		.256	
	A	.022		.016	
Min. pick-up	V	.544			
	A	.034			
Max. pick-up	V	.800	.800	.880	.880
	A	.050	.050	.055	.055
Max. working	V	1.02	1.02	1.13	1.13
	A	.064	.064	.0704	.0704
Max. polar pick-up and working	V	.432	.432	.480	.480
	A	.027	.027	.030	.030

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to S	in.	oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P C to S	in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	Mod 9E	4	51300-1	2

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS
POLARIZED QUICK SHUNT	16 ohms ohms ohms	F B N R 2 FB 2 NR

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V	.560			
	A	.0056			
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V	1.62			
	A	.0162			
Max. pick-up	V				
	A				
Max. working	V	2.40	2.40	2.64	2.64
	A	.024	.024	.0264	.0264
Max. polar pick-up and working	V	.800	.800	.880	.880
	A	.008	.008	.0088	.0088

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time .05 sec. at 3.3 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. 53002-95 Gr 2
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	8	53002-95	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
POLARIZED SLOW RELEASE	100 ohms ohms ohms	F B N R 4 FB 4 NR

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INSTRUCTIONS 390
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.40			
	A	.094			
Min. drop-away without contact pressure	V	.560			
	A	.0056			
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V	1.80			
	A	.018			
Max. pick-up	V				
	A				
Max. working	V	2.35	2.35	2.59	2.59
	A	.0235	.0235	.0259	.0259
Max. polar pick-up and working	V	1.17	1.17	1.29	1.29
	A	.0117	.0117	.0129	.0129

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time .05 sec. at 3.3 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks: ____

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G. R. S. Co.	K	8	53002-112	75

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS
POLARIZED SLOW RELEASE	100 ohms ohms ohms	F B N R 4 FB 4 NR

DATE 7-15-1944 TABLE NO. 651

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.00			
	A	.070			
Min. drop-away without contact pressure	V	.840			
	A	.0042			
Min. drop-away	V	1.54		1.08	
	A	.0077		.0054	
Min. pick-up	V	2.70			
	A	.0135			
Max. pick-up	V				
	A				
Max. working	V	3.50	3.50	3.86	3.86
	A	.0175	.0175	.0193	.0193
Max. polar pick-up and working	V	1.74	1.74	1.92	1.92
	A	.0087	.0087	.0096	.0096

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time Approx 0.1 sec. at 9 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	76

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.820			
	A	.0041			
Min. drop-away	V	1.48		1.04	
	A	.0074		.0052	
Min. pick-up	V	2.44			
	A	.0122			
Max. pick-up	V				
	A				
Max. working	V	3.60	3.60	3.96	3.96
	A	.018	.018	.0198	.0198
Max. polar pick-up and working	V	1.20	1.20	1.32	1.32
	A	.006	.006	.0066	.0066

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time Approx 0.1 sec. at 10 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53002-95 Gr 4
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-95	4

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.65			
	A	.0712			
Min. drop-away without contact pressure	V	1.22			
	A	.0042			
Min. drop-away	V	2.18		1.54	
	A	.0075		.0053	
Min. pick-up	V	4.06			
	A	.014			
Max. pick-up	V				
	A				
Max. working	V	5.16	5.16	5.68	5.68
	A	.0178	.0178	.0196	.0196
Max. polar pick-up and working	V	2.58	2.58	2.84	2.84
	A	.0089	.0089	.0098	.0098

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 9 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-112	52

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	290 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.80			
	A	.062			
Min. drop-away without contact pressure	V	1.48			
	A	.0037			
Min. drop-away	V	2.60		1.84	
	A	.0065		.0046	
Min. pick-up	V	4.80			
	A	.012			
Max. pick-up	V				
	A				
Max. working	V	6.20	6.20	6.84	6.84
	A	.0155	.0155	.0171	.0171
Max. polar pick-up and working	V	3.12	3.12	3.44	3.44
	A	.0078	.0078	.0086	.0086

Min. physical air gap; Neutral .013 in., Polar .012 in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53002-91	53

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		4	FB	4	NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.80			
	A	.062			
Min. drop-away without contact pressure	V	1.48			
	A	.0037			
Min. drop-away	V	2.60		1.84	
	A	.0065		.0046	
Min. pick-up	V	4.80			
	A	.012			
Max. pick-up	V				
	A				
Max. working	V	6.20	6.20	6.84	6.84
	A	.0155	.0155	.0171	.0171
Max. polar pick-up and working	V	3.12	3.12	3.44	3.44
	A	.0078	.0078	.0086	.0086

Min. physical air gap; Neutral .013 in., Polar .012 in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.015 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	8	53002-112	53

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		4	FB	4	NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.00			
	A	.050			
Min. drop-away without contact pressure	V	.988			
	A	.0025			
Min. drop-away	V	2.47		1.73	
	A	.0062		.0043	
Min. pick-up	V	4.75			
	A	.0119			
Max. pick-up	V	5.00			
	A	.0125			
Max. working	V	7.34	7.34	8.07	8.07
	A	.0184	.0184	.0202	.0202
Max. polar pick-up and working	V	3.34	3.34	3.67	3.67
	A	.0084	.0084	.0092	.0092

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time 0.5 sec. at 7.34 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.019 in.	1.75 oz.	.050* in.
B	S	to	S	XXXX	XXXX	.030 in.
P	SIC	to	S	.043 in.	2 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2378 Indiv. 2378C
Remarks: Minimum compression; Neutral contacts-.016 inch, Polar contacts .038 inch.
Polar armature end play .004 to .007 inch.
*.050 minimum and .070 nominal.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-14	8	C-9270	

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		4	FB	4	NR

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.00			
	A	.0488			
Min. drop-away without contact pressure	V	1.35			
	A	.003			
Min. drop-away	V	2.38		1.66	
	A	.0053		.0037	
Min. pick-up	V	4.00			
	A	.0089			
Max. pick-up	V				
	A				
Max. working	V	5.49	5.49	6.04	6.04
	A	.0122	.0122	.0134	.0134
Max. polar pick-up and working	V	2.02	2.02	2.25	2.25
	A	.0045	.0045	.005	.005

Min. physical air gap; Neutral .013 in., Polar .012 in.
Flashes per minute ______ at ______ volts
Release time .05 sec. at 8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53002-95 Gr 3
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-95	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	450 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.20			
	A	.0516			
Min. drop-away without contact pressure	V	1.35			
	A	.003			
Min. drop-away	V	2.43		1.71	
	A	.0054		.0038	
Min. pick-up	V	4.50			
	A	.010			
Max. pick-up	V				
	A				
Max. working	V	5.80	5.80	6.38	6.38
	A	.0129	.0129	.0142	.0142
Max. polar pick-up and working	V	2.88	2.88	3.15	3.15
	A	.0064	.0064	.007	.007

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .05 sec. at 8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S. Co.	K	8	53002-112	77

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	450 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

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INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	17.40			
	A	.087			
Min. drop-away without contact pressure	V	1.24			
	A	.0062			
Min. drop-away	V	2.00		1.40	
	A	.010		.007	
Min. pick-up	V	3.36			
	A	.0168			
Max. pick-up	V				
	A				
Max. working	V	4.34	4.34		
	A	.0217	.0217	.0239	.0239
Max. polar pick-up and working	V	1.92	1.92		
	A	.0096	.0096		

Min. physical air gap; Neutral .013 in., Polar .009 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.048 in.	1.5 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-21
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-131	3

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. 668

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	11.6			
	A	.0465			
Min. drop-away without contact pressure	V	.495			
	A	.002			
Min. drop-away	V	1.32		.924	
	A	.0053		.0037	
Min. pick-up	V	2.63			
	A	.0105			
Max. pick-up	V	2.9			
	A	.0116			
Max. working	V	3.14	3.14	3.454	3.454
	A	.0126	.0126	.0139	.0139
Max. polar pick-up and working	V	2.1	2.1	2.31	2.31
	A	.0084	.0084		

Min. physical air gap; Neutral .013 in., Polar .015 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .2 sec. at 3.84 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.030 in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	1.5 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2745 Indiv. 2745A
Remarks: Minimum compression; Neutral contacts-.027 inch, Polar contacts .037 inch.
Polar armature end play .004 to .007 inch.
Minimum physical air gap of auxiliary armature .013 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-21	8	C-9407-7	194313

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	250 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		4 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 669

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	15.40			
	A	.0384			
Min. drop-away without contact pressure	V	.645			
	A	.0016			
Min. drop-away	V	1.72		1.20	
	A	.0043		.003	
Min. pick-up	V	3.48			
	A	.0087			
Max. pick-up	V	3.84			
	A	.0096			
Max. working	V	4.13	4.13	4.54	4.54
	A	.0103	.0103	.0113	.0113
Max. polar pick-up and working	V	2.44	2.44	2.68	2.68
	A	.0061	.0061	.0067	.0067

Min. physical air gap; Neutral .013 in., Polar .015 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .2 sec. at 5 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.030 in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	1.5 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2745 Indiv. 2745A
Remarks: Minimum compression; Neutral contacts-.027 inch, Polar contacts .037 inch.
Polar armature end play .004 to .007 inch.
Minimum physical air gap of auxiliary armature .013 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-21	8	C-9407-7	228105

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	400 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		4 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 670

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	28.20			
	A	.0588			
Min. drop-away without contact pressure	V	2.00			
	A	.0042			
Min. drop-away	V	3.36		2.35	
	A	.007		.0049	
Min. pick-up	V	5.47			
	A	.0114			
Max. pick-up	V				
	A				
Max. working	V	7.06	7.06	7.77	7.77
	A	.0147	.0147	.0162	.0162
Max. polar pick-up and working	V	3.12	3.12	3.46	3.46
	A	.0065	.0065	.0072	.0072

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.023 in.	1.5 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. ED 28623-21
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-117	2

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	480 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		4 NR	
	___ ohms				

DATE 7-15-1944 TABLE NO. 671

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.75			
	A	.028			
Min. drop-away without contact pressure	V	.806			
	A	.0012			
Min. drop-away	V	2.15		1.50	
	A	.0032		.0224	
Min. pick-up	V	4.30			
	A	.0064			
Max. pick-up	V	4.75			
	A	.0071			
Max. working	V	5.13	5.13	5.64	5.64
	A	.0076	.0076	.0084	.0084
Max. polar pick-up and working	V	3.02	3.02	3.32	3.32
	A	.0045	.0045	.0049	.0049

Min. physical air gap; Neutral .013 in., Polar .015 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .2 sec. at 6.3 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.030 in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.030 in.
P SIC to S	.043 in.	1.5 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2745 Indiv. 2745A
Remarks: Minimum compression; Neutral contacts-
.027 inch, Polar contacts .037 inch.
Polar armature end play .004 to .007 inch.
Minimum physical air gap of auxiliary
armature .013 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-21	8	C-9407-7	213977

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	670 ohms ohms ohms	F	B	N	R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 672

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.70			
	A	.068			
Min. drop-away without contact pressure	V	1.22			
	A	.0042			
Min. drop-away	V	2.18		1.54	
	A	.0075		.0053	
Min. pick-up	V	3.48			
	A	.012			
Max. pick-up	V				
	A				
Max. working	V	4.94	4.93	5.42	5.42
	A	.017	.017	.0187	.0187
Max. polar pick-up and working	V	2.38	2.38	2.62	2.62
	A	.0082	.0082	.009	.009

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P S to S	.027 in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. 53002-86 Gr 12
Remarks: Values shown are for 290 ohm winding.
Maximum pick-up for .17 ohm winding-
.87 amperes.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-86	12

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	.17 ohms 290 ohms ohms	F	B	N	R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 673

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.5			
	A	.094			
Min. drop-away without contact pressure	V	.512			
	A	.002			
Min. drop-away	V	1.28		.900	
	A	.0051		.0036	
Min. pick-up	V				
	A				
Max. pick-up	V	5.9	6.05		
	A	.0235	.0242		
Max. working	V	6.05	6.05	6.655	6.655
	A	.0242	.0242	.0266	.0266
Max. polar pick-up and working	V	1.91	1.91	2.10	2.10
	A	.0077	.0077	.0085	.0085

Min. physical air gap; Neutral .013 in., Polar .006 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.032 in.	1.25 oz.	.080 in.
B S to S	XXXX	XXXX	.080 in.
P SIC to S	.038 in.	1.25 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2585 Indiv. ______
Remarks: Operating values taken with neutralizing coils energized at 10 volts, .040 amps.
Relay designed for operation with 10 volts
on main and neutralizing coils. See service
spec. for range of operation due to variation
of neutralizing energization.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DP-17	8	C-9363-1	191149

Magnetic structure: Silicon steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	250 ohms 250 ohms ohms	F	B	N	R
			4 FB		4 NR

DATE 7-15-1944 TABLE NO. 674

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.20			
	A	.072			
Min. drop-away without contact pressure	V	.300			
	A	.003			
Min. drop-away	V	.700		.490	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V	1.80			
	A	.018			
Max. working	V	1.90		2.09	
	A	.019		.0209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53000-59
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-59	7

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 76

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INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.00			
	A	.054			
Min. drop-away without contact pressure	V	1.15			
	A	.0023			
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V	6.75			
	A	.0135			
Max. working	V	7.25		8.00	
	A	.0145		.016	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53000-59
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-59	14

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 118

NYCS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	19.00			
	A	.038			
Min. drop-away without contact pressure	V	.800			
	A	.0016			
Min. drop-away	V	1.75		1.25	
	A	.0035		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V	4.75			
	A	.0095			
Max. working	V	5.50		6.05	
	A	.011		.0121	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ______ Indiv. 53000-59
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	K	4	53000-59	15

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 125

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SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.00			
	A	.090			
Min. drop-away without contact pressure	V	.640			
	A	.0032			
Min. drop-away	V	1.40		.980	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.50		4.96	
	A	.0225		.0248	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 2.85 sec. at 9.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. 53000-59
Remarks: One half coil - balance washers

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-59	75

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	200 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 191

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.80			
	A	.042			
Min. drop-away without contact pressure	V	.800			
	A	.002			
Min. drop-away	V	1.60		1.12	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V	4.20			
	A	.0105			
Max. working	V	5.00		5.52	
	A	.0125		.0138	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1 to 1.1 sec. at 9.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. ____ Indiv. 53000-59
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	4	53000-59	50

Magnetic structure: Swedish iron

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	400 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 217

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.80			
	A	.0476			
Min. drop-away without contact pressure	V	1.25			
	A	.0025			
Min. drop-away	V	3.00		2.10	
	A	.006		.0042	
Min. pick-up	V				
	A				
Max. pick-up	V	5.95			
	A	.0119			
Max. working	V	6.56		7.22	
	A	.0131		.0144	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time (.8) sec. at (7.5) volts
Pick-up time (1.0) sec. at (9.38) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.050 in.
B S to S	XXXX	XXXX	.050 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2444 Indiv. 2444C
Remarks: Minimum compression - .027 inch plug coupled.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DH-11	4	C 9077-24	157188

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 7-15-1944 TABLE NO. 227

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE 390B

D. C. RELAYS

4-30-1941
7-15-1944

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V	.060			
	A	.015			
Min. drop-away	V	.148		.120	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.300		.330	
	A	.075		.0825	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.058 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression - .027 inch
Back contact capacity - 15 Amps at 30 volts

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DX-13	8	C 9242-5	215683

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 453

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.33		1.33	
	A	.332		.332	
Min. drop-away without contact pressure	V	.088			
	A	.022			
Min. drop-away	V	1.48		1.20	
	A	.037		.030	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.332		.365	
	A	.083		.0913	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.062 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-54 Indiv. ED 28623-24
Remarks: Heavy duty back contacts

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53003-55	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 4 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 459

NYGS SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20	15.00	1.20	
	A	.300	.030	.300	
Min. drop-away without contact pressure	V	.060	.075		
	A	.015	.0015		
Min. drop-away	V	.148	1.85	.120	1.30
	A	.037	.0037	.030	.0026
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.300	3.75	3.30	4.125
	A	.075	.0075	.0825	.0082
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.058 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ____
Remarks: Minimum compression - .027 inch
Back contact capacity - 15 Amps at 30 volts
(1) = Values for 4 ohm winding
(2) = Values for 500 ohm winding

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	DX-13	8	C 9242-5	215682

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	4 ohms 500 ohms ____ ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 7-15-1944 TABLE NO. 470F

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	15.00			
	A	.030			
Min. drop-away without contact pressure	V	.075			
	A	.0015			
Min. drop-away	V	1.85		1.30	
	A	.0037		.0026	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.75		4.125	
	A	.0075		.0082	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.031 in.	2 oz.	.072 in.
B S to S	XXXX	XXXX	.058 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. 2445 Indiv. ______
Remarks: Minimum compression - .027 inch
Back contact capacity - 15 Amps at 30 volts

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
U.S.&S.Co.	DX-13	8	C 9242	

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
INTERLOCKING	500 ohms	______ F	______ B	______ N	______ R
	500 ohms	8 FB		______ NR	
	______ ohms				

DATE 7-15-1944 TABLE NO. 475

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.050 in.
B ______ to ______	XXXX	XXXX	______ in.
P SIC to S	.027 in.	______ oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Neutral contacts connected
internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-105	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms	4 F	______ B	______ N	______ R
	______ ohms	______ FB		4 NR	
	______ ohms				

DATE 7-15-1944 TABLE NO. 582A

NYCS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to G	.015 in.	1.75 oz.	.050 in.
B ______ to ______	XXXX	XXXX	______ in.
P C to G	.027 in.	______ oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Neutral contacts connected
internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
C.R.S.Co.	K	8	53002-109	10

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms	4 F	______ B	______ N	______ R
	______ ohms	______ FB		4 NR	
	______ ohms				

DATE 7-15-1944 TABLE NO. 582B

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	C	to G	.015 in.	1.75 oz.	.050 in.
B		to	XXXX	XXXX	in.
P	C	to G	.027 in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Neutral contacts connected internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-104	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms ohms ohms	4 F	B	N	R
		FB		4 NR	

DATE 7-15-1944 TABLE NO. **582C**

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	C	to G	.015 in.	1.75 oz.	.050 in.
B	S	to S	XXXX	XXXX	.020 in.
P	C	to G	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-84	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. **583A**

NYCS
SC-48

INSTRUCTIONS 390

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to S	.015 in.	1.75 oz.	.050 in.
B	S	to S	XXXX	XXXX	.020 in.
P	SIC	to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Flat bronze polar fingers

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-91	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 7-15-1944 TABLE NO. **583B**

NYGS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.92			
	A	.0696			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.48	3.48	3.82	3.82
	A	.0174	.0174	.0191	.0191
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F C to G	.015 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P C to G	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-110	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. **583C**

NYGS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.60	3.60	3.96	3.96
	A	.018	.018	.0198	.0198
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Flat bronze polar fingers.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-91	9A

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms	F	B	N	R
	ohms	4 FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. **584A**

NYGS
SC-48

INSTRUCTIONS 390

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V	.800			
	A	.004			
Min. drop-away	V	1.46		1.02	
	A	.0073		.0051	
Min. pick-up	V	2.68			
	A	.0134			
Max. pick-up	V				
	A				
Max. working	V	3.60	3.60	3.96	3.96
	A	.018	.018	.0198	.0198
Max. polar pick-up and working	V	1.80	1.80	1.98	1.98
	A	.009	.009	.0099	.0099

Min. physical air gap; Neutral .013 in., Polar .008 in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.015 in.	1.75 oz.	.090 in.
B to	XXXX	XXXX	in.
P SIC to S	.027 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. 33)
Manuf., Spec; Gen. GES 1-51 Indiv. E.D.28623-12
Remarks: Neutral contacts connected
internally to polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	K	8	53002-105	9A

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	200 ohms	4 F	B	N	R
	ohms	FB		4 NR	
	ohms				

DATE 7-15-1944 TABLE NO. **584B**

OHMS	CONTACTS								NEUTRAL ORDINARY ACTING				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.& S.Co., Reference	Table No.	
1.8			4	2			Standard	.050	56001-734 Gr 2	5			
4	2		3				"	.050	56001-730 Gr 1	15			
4	6						"	.050	56001-714 Gr 1	18			
4	4						"	.050			C16648-3 Pc 220495	19	
4	8						"	.050			C16648-3 Pc 220494	23	
4	12						"	.050	56002-702 Gr 1	31			
9	6						"	.050	56001-733 Gr 1	44			
16	6						"	.050	56001-714 Gr 2	52			
16	12						"	.050	56002-702 Gr 2	60			
41	6						"	.050	56001-732 Gr 1	69			
84	6						"	.050	56001-732 Gr 3	78			
100	1		1				"	.050	56001-785 Gr 2	84			
100	6						"	.050	56001-701 Gr 5	85			
200	6						"	.050	56001-701 Gr 6	98			
500	4						H.D.	.090	56001-753 Gr 2	112			
500	2		4	2			Standard	.050	56001-741 Gr 2	115			
500			3	2			E.H.D.	.125	56001-785 Gr 6	118			
500	6						Standard	.050	56001-701 Gr 2	121			
500	12						"	.050	56002-703 Gr 1	127			
550	4						"	.050			C16648-3 Pc 220493	130	
550	8						"	.050			C16648-3 Pc 220492	131	
800	4						"	.050			C16648-3 Pc 221677	150	
800	8						"	.050			C16648-3 Pc 108938	151	
900	2						"	.050	56001-737 Gr 1	162			
900	4						"	.050	56001-716 Gr 2	165			
900	6						"	.050	56001-701 Gr 1	168			
1300	4						"	.050			C16648-3 Pc 218758	180	
1300	8						"	.050			C16648-3 Pc 108937	181	
2240	2						"	.050	56001-737 Gr 3	192			

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
D. C. RELAYS
PURCHASE LIST—PLUG-IN TYPE
393A
8-1-1945

OHMS	CONTACTS								NEUTRAL—OTHER THAN ORDINARY ACTING				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S.Co., Reference	Table No.	U.S.& S.Co., Reference	Table No.	
NEUTRAL SLOW RELEASE													
24	6						Standard	.050	56001-731 Gr 1	203			
80	2						"	.050	56001-727 Gr 2	211			
80			2	4			"	.050	56001-759 Gr 1	215			
140	2						"	.050	56001-727 Gr 1	222			
150	8						"	.050			C16648-3 Pc 226596	225	
194	6						"	.050	56001-718 Gr 1	232			
240	8						"	.050			C16648-3 Pc 226593	236	
250	4						"	.050	56001-739 Gr 27	242			
300	6						"	.050	56001-744 Gr 1	252			
340	6						"	.050	56001-728 Gr 26	257			
460			2				"	.050	56001-735 Gr 26	262			
500	12						"	.050	56002-708 Gr 1	269			
NEUTRAL SLOW PICK-UP													
230	6						"	.050	56001-736 Gr 1	276			
300	4						"	.050	56001-729 Gr 1	282			
NEUTRAL SLOW PICK-UP AND QUICK RELEASE													
42	3		2	1			"	.050	56001-726 Gr 1	292			
NEUTRAL BIASED													
63	6						"	.050	56001-724 Gr 5	295			
NEUTRAL COMPOUND ORDINARY ACTING													
180-180-180	4		8	4			"	.050	56002-785 Gr 1	307			
180-180-180	4		4	8			"	.050	56002-785 Gr 2	310			
180-180-180			8	7			"	.050	56002-785 Gr 3	317			
310-310-310			5	4			"	.050	56001-785 Gr 7	327			
NEUTRAL COMPOUND SLOW RELEASE													
105-105			2	1			"	.050	56001-713 Gr 2	342			
165-165	6						"	.050	56001-754 Gr 1	347			
NEUTRAL POWER TRANSFER													
50-50	2						HD	.050	56001-721 Gr 1	362			
100-100	6						HD	.050	56001-745 Gr 1	368			
NEUTRAL OVERLOAD													
.068-1225	2						EHD	Special	56001-785 Gr 1	386			

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

D. C. RELAYS

PURCHASE LIST—PLUG-IN TYPE

393A
8-1-1945

OHMS	CONTACTS								POLARIZED				REMARKS
	FB	NR	F	B	N	R	Type	Opening	G.R.S. Co., Reference	Table No.	U.S. & S. Co., Reference	Table No.	
									POLARIZED ORDINARY ACTING				
200	4	4					Standard	.050	56003-701 Gr 3	413			
200	4	8					"	.050	56003-707 Gr 3	416			
200	8	4					"	.050	56003-710 Gr 1	422			
240	4	4					"	.050			C16796-3 Pc 226775	424	
400	4	4					"	.050			C16796-3 Pc 230587	430	
500	4	4					"	.050	56003-701 Gr 2	442			
									POLARIZED SLOW RELEASE				
120	4	4					"	.050	56003-709 Gr 2	453			
276	4	4					"	.050	56003-708 Gr 26	458			
476	4	4					"	.050	56003-709 Gr 3	472			
									POLARIZED RETAINED NEUTRAL				
220	6	4					"	.050	56004-702 Gr 1	478			
									POLARIZED COMPOUND				
165-165	8	4					"	.050	56003-785 Gr 3	503			
180-200	4	4					"	.050	56003-785 Gr 4	512			
180-200	2	4	3	3			"	.050	56003-785 Gr 5	515			
200-200	2	4	3	2			"	.050	56003-785 Gr 6	523			
200-200	4	4					"	.050	56003-785 Gr 7	526			
.14-300	2	4	2				"	.050	56003-785 Gr 1	543			
									POLAR				
625-625					8	7	"	.050			C16676-3 Pc 108946	550	
800		8					"	.050			C16676-6 Pc 108945	554	
1300		8					"	.050			C16676-6 Pc 220181	558	
									MOTOR FLASHER				
	4						S-S	.050	57261-701 Gr 4	601			

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.727		.727	
	A	.404		.404	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.110		.090	
	A	.061		.050	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.182		.200	
	A	.101		.111	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-208
Remarks: *Front contacts open on .040 inch.
Two 0.9 ohm coils connected in series
on back of board.
Not gasketed.
See Table 5 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-95	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1.8 ohms ____ ohms ____ ohms	4 F	2 B	____ N	____ R
			____ FB		____ NR

DATE 8-1-1945 TABLE NO. 3

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.727		.727	
	A	.404		.404	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.110		.090	
	A	.061		.050	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.182		.200	
	A	.101		.111	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____).
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-208
Remarks: *Front contacts open on .040 inch.
Two 0.9 ohm coils connected in series
on back of board.
Gasketed.
See Table 5 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-111	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1.8 ohms ____ ohms ____ ohms	4 F	2 B	____ N	____ R
			____ FB		____ NR

DATE 8-1-1945 TABLE NO. 4

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	.727		.727	
	A	.404		.404	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.110		.090	
	A	.061		.050	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.182		.200	
	A	.101		.111	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-734
Remarks: *Front contacts open in .040 inch.
Two 0.9 ohm coils connected in series
on back of board.

Registry 1-2-5-21

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-734	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1.8 ohms ____ ohms ____ ohms	4 F	2 B	____ N	____ R
			____ FB		____ NR

DATE 8-1-1945 TABLE NO. 5

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.164		.134	
	A	.041		.0336	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-110 Gr 1
Remarks: *Front contacts open on .029 inch.
Two 2 ohm coils connected in series
on back of board.
Not gasketed.
See Table 15 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-110	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	3 F	B	N	R
	ohms	2 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 13

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.164		.134	
	A	.041		.0336	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-133
Remarks: *Front contacts open on .029 inch.
Two 2 ohm coils connected in series
on back of board.
Gasketed.
See Table 15 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-133	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	3 F	B	N	R
	ohms	2 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 14

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.20		1.20	
	A	.300		.300	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.164		.134	
	A	.041		.0336	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.260		.286	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-730
Remarks: *Front contacts open on .029 inch.
Two 2 ohm coils connected in series
on back of board.

Registry 1-2-4-20

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-730	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	3 F	B	N	R
	ohms	2 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 15

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.36		1.36	
	A	.340		.340	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.208		.170	
	A	.052		.0426	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.340		.374	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-116 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 2 ohm coils connected in series
on back of board.
Not gasketed.
See Table 18 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-116	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 16

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.36		1.36	
	A	.340		.340	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.208		.170	
	A	.052		.0426	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.340		.374	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-132
Remarks: *Front contacts open on .040 inch.
Two 2 ohm coils connected in series
on back of board.
Gasketed.
See Table 18 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-132	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 17

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.36		1.36	
	A	.340		.340	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.208		.170	
	A	.052		.0426	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.340		.374	
	A	.085		.0935	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-714
Remarks: *Front contacts open on .040 inch.
Two 2 ohm coils connected in series
on back of board.

Registry 1-2-3-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-714	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 18

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D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.97		1.97	
	A	.492		.492	
Min. drop-away without contact pressure	V	.0792			
	A	.0198			
Min. drop-away	V	.184		.151	
	A	.046		.0377	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.492		.540	
	A	.123		.135	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .021 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B ____ to ____	XXXX	XXXX	____ in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ____
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	220495

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ____ ohms ____ ohms	____ F 4 FB	____ B	____ N ____ NR	____ R

DATE 8-1-1945 TABLE NO. 19

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.31		1.31	
	A	.328		.328	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.180		.147	
	A	.045		.0368	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.328		.361	
	A	.082		.0902	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 16
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 52 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	16

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ____ ohms ____ ohms	____ F 6 FB	____ B	____ N ____ NR	____ R

DATE 8-1-1945 TABLE NO. 20

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.31		1.31	
	A	.328		.328	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.180		.147	
	A	.045		.0368	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.328		.361	
	A	.082		.0902	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 38
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 52 for new Replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	38

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ____ ohms ____ ohms	____ F 6 FB	____ B	____ N ____ NR	____ R

DATE 8-1-1945 TABLE NO. 21

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.31		1.31	
	A	.328		.328	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.180		.147	
	A	.045		.0368	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.328		.361	
	A	.082		.0902	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-714
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in multiple
on back of board.

Relay should be ordered from table 52.
Registry 1-2-3-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-714	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ohms ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 22

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.97		1.97	
	A	.492		.492	
Min. drop-away without contact pressure	V	.0792			
	A	.0198			
Min. drop-away	V	.184		.151	
	A	.046		.0377	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.492		.540	
	A	.123		.135	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ____
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	220494

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ohms ohms	____ F	____ B	____ N	____ R
		8 FB		____ NR	

DATE 8-1-1945 TABLE NO. 23

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.08		2.08	
	A	.520		.520	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.300		.246	
	A	.075		.0615	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 6
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 60 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	6

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms ohms ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.08		2.08	
	A	.520		.520	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.300		2.46	
	A	.075		.0615	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 9
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 60 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	12 FB		____ NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 27

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.08		2.08	
	A	.520		.520	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.300		2.46	
	A	.075		.0615	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.520		.572	
	A	.130		.143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-702
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in multiple
on back of board.

Relay should be ordered from table 60.
Registry 1-2-3-6

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-702	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	12 FB		____ NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 28

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.13		2.13	
	A	.532		.532	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.304		.250	
	A	.076		.0624	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.532		.584	
	A	.133		.146	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-63 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 2 ohm coils connected in series
on back of board.
Not gasketed.
See Table 31 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-63	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	____ F	____ B	____ N	____ R
	____ ohms	12 FB		____ NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 29

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.13		2.13	
	A	.532		.532	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.304		.250	
	A	.076		.0624	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.532		.584	
	A	.133		.146	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-64 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 2 ohm coils connected in series
on back of board.
Gasketed.
See Table 31 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-64	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	____ ohms	12 FB		NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 30

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	2.13		2.13	
	A	.532		.532	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.304		.250	
	A	.076		.0624	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.532		.584	
	A	.133		.146	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-702
Remarks: *Front contacts open on .026 inch.
Two 2 ohm coils connected in series
on back of board.

Registry 1-2-4-25

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-702	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	4 ohms	F	B	N	R
	____ ohms	12 FB		NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 31

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	1.48		1.48	
	A	.260		.260	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.205		.168	
	A	.036		.0295	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.371		.408	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 20
Remarks: *Front contacts open on .029 inch.
Two 2.85 ohm coils connected in series
on back of board.
Not gasketed.
See Table 44 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	20

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	5.7 ohms	F	B	N	R
	____ ohms	6 FB		NR	
	____ ohms				

DATE 8-1-1945 TABLE NO. 40

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.48		1.48	
	A	.260		.260	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.205		.168	
	A	.036		.0295	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.371		.408	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-106 Gr 1
Remarks: *Front contacts open on .029 inch.
Two 2.85 ohm coils connected in series
on back of board.
Gasketed.
See Table 44 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-106	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	5.7 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 41

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	1.872		1.872	
	A	.208		.208	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.252		.207	
	A	.028		.023	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.468		.5148	
	A	.052		.0572	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .016 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-733
Remarks: *Front contacts open on .029 inch.
Two 4.5 ohm coils connected in series
on back of board.

Registry 1-2-5-20

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-733	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	9 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 44

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D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.62		2.62	
	A	.164		.164	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.360		.296	
	A	.0225		.0185	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.656		.722	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 16
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in series
on back of board.
Not gasketed.
See Table 52 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	16

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ohms ohms	F	B	N	R
		6 FB		NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.62		2.62	
	A	.164		.164	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.360		.296	
	A	.0225		.0185	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.656		.722	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 38
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in series
on back of board.
Gasketed.
See Table 52 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	38

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 51

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	2.62		2.62	
	A	.164		.164	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.360		.296	
	A	.0225		.0185	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	.656		.722	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-714
Remarks: *Front contacts open on .029 inch.
Two 8 ohm coils connected in series
on back of board.

Registry 1-2-3-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-714	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 52

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	4.16		4.16	
	A	.260		.260	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.600		.492	
	A	.0375		.0308	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.04		1.144	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 6
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in series
on back of board.
Not gasketed.
See Table 60 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	6

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ohms ohms	F	B	N	R
		12 FB		NR	

DATE 8-1-1945 TABLE NO. 58

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	4.16		4.16	
	A	.260		.260	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.600		.492	
	A	.0375		.0308	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.04		1.144	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 9
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in series
on back of board.
Gasketed.
See Table 60 for new replacement relay

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	9

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	4.16		4.16	
	A	.260		.260	
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.600		.492	
	A	.0375		.0308	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.04		1.144	
	A	.065		.0715	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-702
Remarks: *Front contacts open on .026 inch.
Two 8 ohm coils connected in series
on back of board.

Registry 1-2-3-6

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-702	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	16 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

DATE 8-1-1945 TABLE NO. **60**

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	4.60			
	A	.184			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.500		.350	
	A	.020		.014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.15		1.27	
	A	.046		.0506	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-119 Gr 1
Remarks: *Front contacts open on .029 inch.
Two 50 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 84 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-119	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	25 ohms ____ ohms ____ ohms	1 F	____ B	____ N	____ R
		1 FB		____ NR	

DATE 8-1-1945 TABLE NO. **65**

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.60			
	A	.184			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.500		.350	
	A	.020		.014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.15		1.27	
	A	.046		.0506	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-785 Gr 2
Remarks: *Front contacts open on .029 inch.
Two 50 ohm coils connected in multiple
on back of board.

Relay should be ordered from Table 84
Registry 1-2-5-25

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-785	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	25 ohms	1 F	B	N	R
	ohms				
	ohms	1 FB		NR	

DATE 8-1-1945 TABLE NO. 66

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.00			
	A	.122			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.451		.316	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.25		1.375	
	A	.0305		.0336	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 24
Remarks: *Front contacts open on .040 inch.
Two 20.5 ohm coils connected in series
on back of board.
Not gasketed.
See Table 69 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	24

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	41 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 67

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.00			
	A	.122			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.451		.316	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.25		1.375	
	A	.0305		.0336	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-108 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 20.5 ohm coils connected in series
on back of board.
Gasketed.
See Table 69 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-108	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	41 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 68

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.00			
	A	.122			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.451		.316	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.25		1.375	
	A	.0305		.0336	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-732
Remarks: *Front contacts open on .040 inch.
Two 20.5 ohm coils connected in series
on back of board.

Registry 1-2-5-19

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-732	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	41 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		6 FB		___ NR	

DATE 8-1-1945 TABLE NO. 69

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.39			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.739		.521	
	A	.0088		.0062	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.85		2.033	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 19
Remarks: *Front contacts open on .040 inch.
Two 42 ohm coils connected in series
on back of board.
Not gasketed.
See Table 78 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	19

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	84 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		6 FB		___ NR	

DATE 8-1-1945 TABLE NO. 76

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.39			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.739		.521	
	A	.0088		.0062	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.85		2.033	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 34
Remarks: *Front contacts open on .040 inch.
Two 42 ohm coils connected in series
on back of board.
Gasketed.
See Table 78 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	34

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	84 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		6 FB		___ NR	

DATE 8-1-1945 TABLE NO. 77

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.39			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.739		.521	
	A	.0088		.0062	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.85		2.033	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-732
Remarks: *Front contacts open on .040 inch.
Two 42 ohm coils connected in series
on back of board.

Registry 1-2-5-19

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-732	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	84 ohms ____ ohms ____ ohms	____ F ____ B	____ N ____ R
		6 FB	____ NR

DATE 8-1-1945 TABLE NO. 78

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.20			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.30		2.53	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-119 Gr 1
Remarks: *Front contacts open on .029 inch.
Two 50 ohm coils connected in series
on back of board.
Gasketed.
See Table 84 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-119	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	1 F ____ B	____ N ____ R
		1 FB	____ NR

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.20			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.00		.700	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.30		2.53	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-785 Gr 2
Remarks: *Front contacts open on .029 inch.
Two 50 ohm coils connected in series
on back of board.

Registry 1-2-5-25

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-785	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS	
NEUTRAL ORDINARY ACTING	100 ohms ____ ohms ____ ohms	1 F ____ B	____ N ____ R
		1 FB	____ NR

DATE 8-1-1945 TABLE NO. 84

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	9.60			
	A	.096			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.20		.84	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.40		2.64	
	A	.024		.0264	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 50 ohm coils connected in series
on back of board.

Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	5

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	100 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	11.50			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.42		1.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.88		3.17	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 88

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	11.50			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.42		1.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.88		3.17	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 89

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	11.50			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.42		1.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.88		3.17	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.033* in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in multiple
on back of board.

Relay should be ordered from Table 121.
Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 90

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.00			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.875		1.31	
	A	.015		.0105	
Min. pick-up	V				
	A				
Max. pick-up	V	3.00			
	A	.024			
Max. working	V	3.50		3.85	
	A	.028		.0308	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.022* in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 127 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-56	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms ohms ohms	F	B	N	R
		12 FB		NR	

DATE 8-1-1945 TABLE NO. 94

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.00			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.875		1.31	
	A	.015		.0105	
Min. pick-up	V				
	A				
Max. pick-up	V	3.00			
	A	.024			
Max. working	V	3.50		3.85	
	A	.028		.0308	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.022* in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 127 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-61	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms ohms ohms	F	B	N	R
		12 FB		NR	

DATE 8-1-1945 TABLE NO. 95

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.00			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.875		1.31	
	A	.015		.0105	
Min. pick-up	V				
	A				
Max. pick-up	V	3.00			
	A	.024			
Max. working	V	3.50		3.85	
	A	.028		.0308	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.

Relay should be ordered from Table 127.
Registry 1-2-4-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-703	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	125 ohms ohms ohms	F	B	N	R
		12 FB		NR	

DATE 8-1-1945 TABLE NO. 96

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	14.40			
	A	.072			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.80		1.26	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.60		3.96	
	A	.018		.0198	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 100 ohm coils connected in series
on back of board.

Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	6

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 98

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.50			
	A	.060			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.17		.833	
	A	.0052		.0037	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.38		3.72	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.040 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-148
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 162 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-55	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	225 ohms ohms ohms	F	B	N	R
		2 FB		NR	

DATE 8-1-1945 TABLE NO. 101

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.26			
	A	.0456			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.04		.720	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.57		2.82	
	A	.0114		.0125	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-157
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 162 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-134	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	225 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	2 FB		___ NR	

DATE 8-1-1945 TABLE NO. 102

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.26			
	A	.0456			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.04		.720	
	A	.0046		.0032	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.57		2.82	
	A	.0114		.0125	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-737
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in multiple
on back of board.

Relay should be ordered from Table 162
Registry 1-2-5-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-737	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	225 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	2 FB		___ NR	

DATE 8-1-1945 TABLE NO. 103

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	24.00			
	A	.048			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.00		6.60	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-155
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Not gasketed.
See Table 112 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-86	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	___ F	___ B	___ N	___ R
	___ ohms ___ ohms	4 FB		___ NR	

DATE 8-1-1945 TABLE NO. 110

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.00			
	A	.048			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.00		6.60	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-155
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Gasketed.
See Table 112 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	1	56001-126	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 111

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	24.00			
	A	.048			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.00		6.60	
	A	.012		.0132	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-753
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.

Registry 1-2-7-27

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	1	56001-753	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 112

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-153
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Not gasketed.
See Table 115 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	1	56001-82	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	4 F	2 B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 113

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-153
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Gasketed.
See Table 115 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-135	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	4 F	2 B	____ N	____ R
	____ ohms		2 FB		____ NR
	____ ohms				

DATE 8-1-1945 TABLE NO. 114

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-741
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.

Registry 1-2-6-11

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-741	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	4 F	2 B	____ N	____ R
	____ ohms		2 FB		____ NR
	____ ohms				

DATE 8-1-1945 TABLE NO. 115

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	30.00			
	A	.060			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.50		8.25	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	____ oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 11C
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Two contacts equipped with magnetic blow-outs
Not gasketed.
See Table 118 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	11C

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms	3 F	2 B	____ N	____ R
	____ ohms		____ FB		____ NR
	____ ohms				

DATE 8-1-1945 TABLE NO. 116

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	30.00			
	A	.060			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.50		8.25	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 39C
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Two contacts equipped with magnetic blow-outs
Gasketed.
See Table 118 for new replacement relay

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	39C

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	3 F	2 B	N	R
		FB		NR	

DATE 8-1-1945
TABLE NO. 117

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	30.00			
	A	.060			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.00		1.40	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.50		8.25	
	A	.015		.0165	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-785 Gr 6
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Two contacts equipped with magnetic blow-outs

Registry 1-2-7-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-785	6

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	3 F	2 B	N	R
		FB		NR	

DATE 8-1-1945
TABLE NO. 118

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Not gasketed.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945
TABLE NO. 119

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-105 Gr 2
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Gasketed.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 120

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board.

Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 121

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.00			
	A	.056			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.75		2.60	
	A	.0075		.0052	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.
Not gasketed.
See Table 127 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-56	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

DATE 8-1-1945 TABLE NO. 125

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.00			
	A	.056			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.75		2.60	
	A	.0075		.0052	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.
Gasketed.
See Table 127 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-61	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

DATE 8-1-1945 TABLE NO. 126

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.00			
	A	.056			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.75		2.60	
	A	.0075		.0052	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.00		7.70	
	A	.014		.0154	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-167
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.

Registry 1-2-4-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-703	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	500 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		12 FB		____ NR	

DATE 8-1-1945 TABLE NO. 127

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.30			
	A	.046			
Min. drop-away without contact pressure	V	1.03			
	A	.0019			
Min. drop-away	V	2.40		1.70	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30		6.93	
	A	.0115		.0126	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .021 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ____
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	220493

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	550 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 130

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.30			
	A	.046			
Min. drop-away without contact pressure	V	1.03			
	A	.0019			
Min. drop-away	V	2.40		1.70	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30		6.93	
	A	.0115		.0126	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	220492

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	550 ohms	___ F	___ B	___ N	___ R
	___ ohms	8 FB		___ NR	
	___ ohms				

DATE 8-1-1945 TABLE NO. 131

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	31.00			
	A	.039			
Min. drop-away without contact pressure	V	1.24			
	A	.0015			
Min. drop-away	V	2.90		2.00	
	A	.0036		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.80		8.56	
	A	.0097		.0107	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .021 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	221677

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	800 ohms	___ F	___ B	___ N	___ R
	___ ohms	4 FB		___ NR	
	___ ohms				

DATE 8-1-1945 TABLE NO. 150

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	31.00			
	A	.039			
Min. drop-away without contact pressure	V	1.24			
	A	.0015			
Min. drop-away	V	2.90		2.00	
	A	.0036		.0025	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.80		8.56	
	A	.0097		.0107	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	108938

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	800 ohms	___ F	___ B	___ N	___ R
	___ ohms	8 FB		___ NR	
	___ ohms				

DATE 8-1-1945 TABLE NO. 151

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.62			
	A	.0296			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.34		1.62	
	A	.0026		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.66		7.29	
	A	.0074		.0081	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-148
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.
Not gasketed.
See Table 162 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-55	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 160

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.52			
	A	.0228			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.07		1.44	
	A	.0023		.0016	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.13		5.66	
	A	.0057		.0063	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-157
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.
Gasketed.
See Table 162 for new replacement relay

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-134	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 161

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	20.52			
	A	.0228			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.07		1.44	
	A	.0023		.0016	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.13		5.66	
	A	.0057		.0063	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-737
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.

Registry 1-2-5-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-737	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 162

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.028			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.88		1.98	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30		6.93	
	A	.007		.0077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-155
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.
Not gasketed.
See Table 165 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-56	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 163

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.028			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.88		1.98	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30		6.93	
	A	.007		.0077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-155
Remarks: *Front contacts open at .040 inch.
Two 450 ohm coils in series on back of
board.
Gasketed.
See Table 165 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-136	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 164

NYGS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.028			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.88		1.98	
	A	.0032		.0022	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30		6.93	
	A	.007		.0077	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-716
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.

Registry 1-2-3-28

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-716	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms	____ F	____ B	____ N	____ R
	____ ohms				
	____ ohms	4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 165

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.80			
	A	.032			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.60		2.52	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.20		7.92	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.
Not gasketed.
See Table 168 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 166

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.80			
	A	.032			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.60		2.52	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.20		7.92	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.
Gasketed.
See Table 168 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 167

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.80			
	A	.032			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.60		2.52	
	A	.004		.0028	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.20		7.92	
	A	.008		.0088	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 450 ohm coils connected in series
on back of board.

Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	900 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 168

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	39.00			
	A	.030			
Min. drop-away without contact pressure	V	1.59			
	A	.0012			
Min. drop-away	V	3.70		2.60	
	A	.0028		.002	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.80		10.78	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .021 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	218758

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1300 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		4 FB		___ NR	

DATE 8-1-1945 TABLE NO. 180

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	39.00			
	A	.030			
Min. drop-away without contact pressure	V	1.59			
	A	.0012			
Min. drop-away	V	3.70		2.60	
	A	.0028		.002	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.80		10.78	
	A	.0075		.0083	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .021 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C-16648-3	108937

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	1300 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		8 FB		___ NR	

DATE 8-1-1945 TABLE NO. 181

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	33.15			
	A	.0148			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.362		2.464	
	A	.0015		.0011	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.290		9.18	
	A	.0037		.0041	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-157
Remarks: *Front contacts open on .040 inch.
Two 1120 ohm coils connected in series
on back of board.
Gasketed.
See Table 192 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-131	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2240 ohms ______ ohms ______ ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 8-1-1945 TABLE NO. 191

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	33.15			
	A	.0148			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.362		2.464	
	A	.0015		.0011	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.290		9.180	
	A	.0037		.0041	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-737
Remarks: *Front contacts open on .040 inch.
Two 1120 ohm coils connected in series
on back of board.

Registry 1-2-4-26

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-737	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL ORDINARY ACTING	2240 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 192

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.01			
	A	.212			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.504		.353	
	A	.021		.0147	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.27			
	A	.053			
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 2.6-2.85 sec. at 8.0 volts
Pick-up time .15-0.2 sec. at 8.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-109 Gr 1
Remarks: *Front contacts open on .029 inch.
One 24 ohm coil.
Not gasketed.

See Table 203 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-109	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	24 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 201

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	5.01			
	A	.212			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.504		.353	
	A	.021		.0147	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.27		1.40	
	A	.053		.0583	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 2.6-2.85 sec. at 8.0 volts
Pick-up time .15-0.2 sec. at 8.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-107 Gr 1
Remarks: *Front contacts open on .029 inch.
One 24 ohm coil.
Gasketed.

See Table 203 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-107	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	24 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 202

NYCS SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	5.376			
	A	.224			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.504		.353	
	A	.021		.0147	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.27		1.40	
	A	.053		.0583	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.8 sec. at 8.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-731
Remarks: *Front contact open on .029 inch.
One 24 ohm coil.

Registry 1-2-5-8

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-731	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	24 ohms ohms ohms	F B N R 6 FB NR

DATE 8-1-1945 TABLE NO. 203

NYCS SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	5.00			
	A	.122			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.410		.287	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.251		1.378	
	A	.0305		.0336	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .75 to .9 sec. at 8.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. ____
Remarks: *Front contacts open on .040 inch.
Two 20.5 ohm coils connected in series.
Rectifier Dwg No 59135-1, Gr 2 or 57592-2,
Gr 7 connected across coils to obtain slow
release. See Table 69.
Gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-108	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	41 ohms ohms ohms	F B N R 6 FB NR

DATE 8-1-1945 TABLE NO. 206

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	5.00			
	A	.122			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.410		.287	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.251		1.378	
	A	.0305		.0336	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .75 to .9 sec. at 8.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-732
Remarks: *Front contacts open on .040 inch.
Two 20.5 ohm coils connected in series.
Rectifier Dwg No 59135-1, Gr 2 or 57592-2,
Gr 1 connected across coils to obtain slow
release. Ordered from Table 69.
Registry 1-2-5-19

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-732	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	41 ohms ohms ohms	F B N R 6 FB NR

DATE 8-1-1945 TABLE NO. 207

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.424			
	A	.0728			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.448		.312	
	A	.0056		.0039	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.456		1.60	
	A	.0182		.020	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .13 sec. at 4.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. ____
Remarks: *Front contacts open on .040 inch.
Two 40 ohm coils connected in series
on back of board.
Gasketed.
See Table 211 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-137	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	80 ohms ohms ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 8-1-1945 TABLE NO. 210

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	4.424			
	A	.0728			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.448		.312	
	A	.0056		.0039	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.456		1.60	
	A	.0182		.020	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .13 sec. at 4.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-727
Remarks: *Front contacts open on .040 inch.
Two 40 ohm coils connected in series
on back of board.

Registry 1-2-4-22

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-727	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	80 ohms ohms ohms	___ F	___ B	___ N	___ R
		2 FB		___ NR	

DATE 8-1-1945 TABLE NO. 211

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	7.26			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.520		.368	
	A	.0065		.0046	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.84		2.024	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 0.1 sec. at 2.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-759
Remarks: *Front contacts open on .040 inch.
Two 40 ohm coils connected in series
on back of board.

Registry 1-2-9-10

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-759	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	80 ohms ohms ohms	2 F	4 B	___ N	___ R
		___ FB		___ NR	

DATE 8-1-1945 TABLE NO. 215

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	7.90			
	A	.0564			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.616		.434	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.97		2.17	
	A	.0141		.0155	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.3 sec. at 4.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.033* in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-115 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 70 ohm coils connected in series
on back of board.
Not gasketed.
See Table 222 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-115	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	140 ohms ohms ohms	F	B	N	R
		2 FB		NR	

DATE 8-1-1945 TABLE NO. 220

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SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	7.90			
	A	.0564			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.616		.434	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.97		2.17	
	A	.0141		.0155	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.3 sec. at 4.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.033* in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-137
Remarks: *Front contacts open on .040 inch.
Two 70 ohm coils connected in series
on back of board.
Gasketed.
See Table 222 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-137	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	140 ohms ohms ohms	F	B	N	R
		2 FB		NR	

DATE 8-1-1945 TABLE NO. 221

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	7.90			
	A	.0564			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.616		.434	
	A	.0044		.0031	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.97		2.17	
	A	.0141		.0155	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.3 sec. at 4.2 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.033* in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P		to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-727
Remarks: *Front contacts open on .040 inch.
Two 70 ohm coils connected in series
on back of board.

Registry 1-2-4-22

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-727	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	140 ohms ohms ohms	F	B	N	R
		2 FB		NR	

DATE 8-1-1945 TABLE NO. 222

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	21.30			
	A	.142			
Min. drop-away without contact pressure	V	.86			
	A	.0057			
Min. drop-away	V	2.0		1.40	
	A	.0133		.0093	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.33		5.863	
	A	.0356		.0392	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time (0.8) sec. at (5.84) volts
Pick-up time (1.0) sec. at (9.16) volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. 3166 Indiv. ____
Remarks: Minimum compression .040 inch.
Use short coil and copper ferrule.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co	PN-50		C-16648-3	226596

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	150 ohms	F	B	N	R
	ohms				
	ohms	8 FB		NR	

DATE 8-1-1945 TABLE NO. 225

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	26.40			
	A	.136			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.36		.950	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.60		7.26	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.6 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 30
Remarks: *Front contacts open on .040 inch.
One 194 ohm coil.
Not gasketed.

See Table 232 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	30

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	194 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 230

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	26.40			
	A	.136			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.36		.950	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.60		7.26	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.6 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 40
Remarks: *Front contacts open on .040.
One 194 ohm coil.
Gasketed.

See Table 232 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	40

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	194 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 231

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	26.40			
	A	.136			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.36		.950	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.60		7.26	
	A	.034		.0374	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time 1.6 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-718
Remarks: *Front contacts open on .040 inch.
One 194 ohm coil.

Registry 1-2-3-20

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-718	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	194 ohms ohms ohms	___ F	___ B	___ N	___ R
		6 FB		___ NR	

DATE 8-1-1945 TABLE NO. 232

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	27.92			
	A	.116			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.62		1.83	
	A	.0109		.0076	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.98		7.68	
	A	.0291		.032	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time (0.6) sec. at (8.74) volts
Pick-up time (0.75) sec. at (13.1) volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.050 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3166 Indiv. ______
Remarks: Minimum compression .040 inch.
Uses coil wound on copper sleeve.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PN-50		C16648-3	226593

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	240 ohms ohms ohms	___ F	___ B	___ N	___ R
		8 FB		___ NR	

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) ___ amps. at ___ volts (Par. ___)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks: ______

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.

Magnetic structure: ______

KIND	RESISTANCE	CONTACTS			
	ohms ohms ohms	___ F	___ B	___ N	___ R
		___ FB		___ NR	

DATE 8-1-1945 TABLE NO. ______

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.78			
	A	.0712			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.43		1.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.50		4.90	
	A	.0178		.0196	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .9 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-160
Remarks: *Front contacts open on .040 inch.
One 250 ohm coil.
Not gasketed.

See Table 242 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-83	27

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	250 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.78			
	A	.0712			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.43		1.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.50		4.90	
	A	.0178		.0196	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .9 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-160
Remarks: *Front contacts open on .040 inch.
One 250 ohm coil.
Gasketed.

See Table 242 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-136	27

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	250 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 4 FB ____ NR

DATE 8-1-1945 TABLE NO. 241

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ____ in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	in.	oz.	in.
B ____ to ____	XXXX	XXXX	in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) ____ amps. at ____ volts (Par. ____)
Manuf., Spec; Gen. ____ Indiv. ____
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.

Magnetic structure:

KIND	RESISTANCE	CONTACTS
	____ ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R ____ FB ____ NR

DATE 8-1-1945 TABLE NO.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 393A
8-1-1945
D. C. RELAYS

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.78			
	A	.0712			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.43		1.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.50		4.90	
	A	.0178		.0196	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ______ in.

Flashes per minute ______ at ______ volts

Release time .9 sec. at 10.0 volts

Pick-up time ______ sec. at ______ volts

Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)

Manuf., Spec; Gen. GES 1-54 Indiv. 56001-739

Remarks: *Front contacts open on .040 inch.
One 250 ohm coil.

Registry 1-2-6-9

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-739	27

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms	___ F	___ B	___ N	___ R
	______ ohms	4 FB		___ NR	
	______ ohms				

DATE 8-1-1945 TABLE NO. 242

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.

Flashes per minute ______ at ______ volts

Release time .2 sec. at 10.0 volts

Pick-up time ______ sec. at ______ volts

Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.040 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)

Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156

Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils. One coil shunted.
Not gasketed.

See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms	___ F	___ B	___ N	___ R
	______ ohms	6 FB		___ NR	
	______ ohms				

DATE 8-1-1945 TABLE NO. 243

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ______ in.

Flashes per minute ______ at ______ volts

Release time .2 sec. at 10.0 volts

Pick-up time ______ sec. at ______ volts

Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)

Manuf., Spec; Gen. GES 1-54 Indiv. 56001-105 Gr 2

Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils. One coil shunted.
Gasketed.

See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms	___ F	___ B	___ N	___ R
	______ ohms	6 FB		___ NR	
	______ ohms				

DATE 8-1-1945 TABLE NO. 244

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.00			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time .2 sec. at 10.0 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils. One coil shunted.

Relay should be ordered from table 121
Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	250 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 245

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	32.40			
	A	.108			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.10		1.47	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.10		8.91	
	A	.027		.0297	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .005 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time 1.7 sec. at 8.4 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 22
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.
Not gasketed.

See Table 252 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	22

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	300 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 250

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	32.40			
	A	.108			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.10		1.47	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.10		8.91	
	A	.027		.0297	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .005 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time 1.7 sec. at 8.4 volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-127 Gr 1
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.
Gasketed.

See Table 252 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-127	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	300 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 251

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	32.40			
	A	.108			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.10		1.47	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.10		8.91	
	A	.027		.0297	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .005 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.7 sec. at 8.4 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-744
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.

Registry 1-2-6-14

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-744	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	300 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 252

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.80			
	A	.076			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.87		1.33	
	A	.0055		.0039	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.46		7.11	
	A	.019		.0209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.0 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-173
Remarks: *Front contacts open on .040 inch.
One 340 ohm coil.
Not gasketed.

See Table 257 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	340 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 255

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.80			
	A	.076			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.87		1.33	
	A	.0055		.0039	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.46		7.11	
	A	.019		.0209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.0 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-105 Gr 26
Remarks: *Front contacts open on .040 inch.
One 340 ohm coil.
Gasketed.

See Table 257 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	340 ohms	F	B	N	R
	ohms				
	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. 256

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.80			
	A	.076			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.87		1.33	
	A	.0055		.0039	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.46		7.11	
	A	.019		.0209	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 1.0 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.033* in.	1.75 oz.	.050 in.
B	S to	S	XXXX	XXXX	.020 in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-173
Remarks: *Front contacts open on .040 inch.
One 340 ohm coil.

Registry 1-2-4-23

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-728	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	340 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. 257

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.90			
	A	.052			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.20		.828	
	A	.0026		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.98		6.58	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 3.0 sec. at 9.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.033* in.	1.75 oz.	.050 in.
B	to		XXXX	XXXX	in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv 56001-104 Gr 26
Remarks: *Front contacts open on .040 inch.
One 460 ohm coil.
Gasketed.

See Table 262 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-104	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	460 ohms ohms ohms	2 F	B	N	R
		FB		NR	

DATE 8-1-1945 TABLE NO. 261

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.90			
	A	.052			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.20		.828	
	A	.0026		.0018	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.98		6.58	
	A	.013		.0143	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time 3.0 sec. at 9.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	SIC to	S	.033* in.	1.75 oz.	.050 in.
B	to		XXXX	XXXX	in.
P	to		in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-735
Remarks: *Front contacts open on .040 inch.
One 460 ohm coil.

Registry 1-2-5-22

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-735	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	460 ohms ohms ohms	2 F	B	N	R
		FB		NR	

DATE 8-1-1945 TABLE NO. 262

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .2 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-156
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board. Not gasketed.
Rectifier 54728-43, Gr 1 connected across
coils to obtain slow release.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-87	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 6 FB ____ NR

DATE 8-1-1945 TABLE NO. 264

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	22.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .2 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-105 Gr 2
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils connected in series
on back of board. Gasketed.
Rectifier 54728-43, Gr 1 connected across
coils to obtain slow release.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 6 FB ____ NR

DATE 8-1-1945 TABLE NO. 265

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	23.00			
	A	.046			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0057		.004	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.0115		.0127	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .2 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contact open on .040 inch.
Two 250 ohm coils connected in series
on back of board.
Rectifier 59135-1, Gr 2 connected across
coils to obtain slow release.
Registry 1-2-3-4 Ordered from Table 121

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL SLOW RELEASE	500 ohms ____ ohms ____ ohms	____ F ____ B ____ N ____ R 6 FB ____ NR

DATE 8-1-1945 TABLE NO. 266

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time .5 sec. at 10.8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 5
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.
Rectifier Dwg No 54729-19, Gr 1 connected
across coils to obtain slow release.
Not gasketed. See Table 269

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	5

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	F	B	N	R
	ohms				
	ohms	12 FB		NR	

DATE 8-1-1945 TABLE NO. 267

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time .5 sec. at 10.8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 10
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.
Rectifier 54729-19, Gr 1 connected across
coils to obtain slow releas.
Gasketed. See Table 269

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	10

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	F	B	N	R
	ohms				
	ohms	12 FB		NR	

DATE 8-1-1945 TABLE NO. 268

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	21.00			
	A	.042			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.50		1.75	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.25		5.80	
	A	.0105		.0116	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time .5 sec. at 10.8 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-708
Remarks: *Front contacts open on .026 inch.
Two 250 ohm coils connected in series
on back of board.
Rectifier 54729-19, Gr 1 connected across
coils to obtain slow release.
Registry 1-2-7-28

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-708	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW RELEASE	500 ohms	F	B	N	R
	ohms				
	ohms	12 FB		NR	

DATE 8-1-1945 TABLE NO. 269

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	35.88			
	A	.156			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.92		2.74	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.97		9.89	
	A	.039		.043	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .6 sec. at 11.0 volts
Pick-up time 1.5 sec. at 11.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-120 Gr 1
Remarks: *Front contacts open on .040 inch.
One 230 ohm coil.
Gasketed.

See Table 276 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-120	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	230 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 275

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	35.88			
	A	.156			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.92		2.74	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.97		9.89	
	A	.039		.043	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .015 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .6 sec. at 11.0 volts
Pick-up time 1.5 sec. at 11.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-736
Remarks: *Front contacts open on .040 inch.
One 230 ohm coil.

Registry 1-2-6-24

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-736	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	230 ohms	F	B	N	R
	ohms	6 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 276

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	36.00			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70		1.89	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.00		9.90	
	A	.030		.033	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 2.3 sec. at 10.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-117 Gr 1
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.
Not gasketed.

See Table 282 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-117	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	300 ohms	F	B	N	R
	ohms	4 FB		NR	
	ohms				

DATE 8-1-1945 TABLE NO. 280

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.00			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70		1.89	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.00		9.90	
	A	.030		.033	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 2.3 sec. at 10.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-138 Gr 1
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.
Gasketed.

See Table 282 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-138	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	300 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 8-1- 1945 TABLE NO. 281

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.00			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70		1.89	
	A	.009		.0063	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	9.00		9.90	
	A	.030		.033	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .013 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time 2.3 sec. at 10.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-729
Remarks: *Front contacts open on .040 inch.
One 300 ohm coil.

Registry 1-2-4-24

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-729	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP	300 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		____ NR	

DATE 8-1-1945 TABLE NO. 282

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	6.89			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.798		.559	
	A	.019		.0133	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.72		1.89	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time .45 sec. at 4.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 33
Remarks: *Front contacts open on .029 inch.
One coil shunted on back contact.
Special adjustment.
Not gasketed.
See Table 292 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	33

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP QUICK DROP-AWAY	42 ohms ____ ohms ____ ohms	2 F	1 B	____ N	____ R
		3 FB		____ NR	

DATE 8-1- 1945 TABLE NO. 290

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.89			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.798		.559	
	A	.019		.0133	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.72		1.89	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time .45 sec. at 4.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 29
Remarks: *Front contacts open on .029 inch.
One coil shunted on back contact.
Special adjustment.
Gasketed.
See Table 292 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	29

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP QUICK DROP-AWAY	42 ohms ohms ohms	2 F	1 B	N	R
		3 FB		NR	

DATE 8-1-1945 TABLE NO. **291**

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.89			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.798		.559	
	A	.019		.0133	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.72		1.89	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time .45 sec. at 4.0 volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-726
Remarks: *Front contacts open on .029 inch.
One coil shunted on back contact.
Special adjustment.

Registry 1-2-4-21

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-726	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL SLOW PICK-UP QUICK DROP-AWAY	42 ohms ohms ohms	2 F	1 B	N	R
		3 FB		NR	

DATE 8-1-1945 TABLE NO. **292**

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	6.30			
	A	.100			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.693		.485	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	1.575		1.733	
	A	.025		.0275	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.026* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-724
Remarks: *Front contacts open on .029 inch.
Two 31.5 ohm coils connected in series
on back of board.

Registry 1-2-4-13

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-724	5

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL BIASED	63 ohms ohms ohms	F	B	N	R
		6 FB		NR	

DATE 8-1-1945 TABLE NO. **295**

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.30			
	A	.168			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.42		2.39	
	A	.019		.0133	
Min. pick-up	V	6.12			
	A	.034			
Max. pick-up	V				
	A				
Max. working	V	7.56		8.32	
	A	.042		.0462	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 7
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 307 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	7

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	4 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		NR	

DATE 8-1-1945 TABLE NO. 305

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.30			
	A	.168			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.42		2.39	
	A	.019		.0133	
Min. pick-up	V	6.12			
	A	.034			
Max. pick-up	V				
	A				
Max. working	V	7.56		8.32	
	A	.042		.0462	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 8
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 307 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	8

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	4 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		NR	

DATE 8-1-1945 TABLE NO. 306

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	30.30			
	A	.168			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.42		2.39	
	A	.019		.0133	
Min. pick-up	V	6.12			
	A	.034			
Max. pick-up	V				
	A				
Max. working	V	7.56		8.32	
	A	.042		.0462	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	in.	oz.	in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-785 Gr 1
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.

Registry 1-2-5-27

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-785	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	4 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		NR	

DATE 8-1-1945 TABLE NO. 307

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	29.50			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.64	
	A	.021		.0147	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	7.40		8.14	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 4
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 310 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	4

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	4 F	8 B	___ N	___ R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		___ NR	

DATE 8-1-1945 TABLE NO. 308

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	29.50			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.64	
	A	.021		.0147	
Min. pick-up	V	6.48			
	A	.036			
Max. pick-up	V				
	A				
Max. working	V	7.40		8.14	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 11
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 310 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	11

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	4 F	8 B	___ N	___ R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		___ NR	

DATE 8-1-1945 TABLE NO. 309

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	29.50			
	A	.164			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.64	
	A	.021		.0147	
Min. pick-up	V	6.48			
	A	.036			
Max. pick-up	V				
	A				
Max. working	V	7.40		8.14	
	A	.041		.0451	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ___ in.
Flashes per minute ___ at ___ volts
Release time ___ sec. at ___ volts
Pick-up time ___ sec. at ___ volts
Max. reversal time ___ sec. at ___ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ___ to ___	___ in.	___ oz.	___ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-785 Gr 2
Remarks: *Front contact open on .026 inch.
Three 180 ohm coils.
Test each winding separately.

Registry 1-2-7-29

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-785	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	4 F	8 B	___ N	___ R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	4 FB		___ NR	

DATE 8-1-1945 TABLE NO. 310

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.40			
	A	.141			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.06		2.14	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.34		6.97	
	A	.0352		.0387	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 1
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 317 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	7 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	FB		NR	

DATE 8-1-1945 TABLE NO. 315

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.40			
	A	.141			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.06		2.14	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.36		6.97	
	A	.0352		.0387	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-85 Gr 12
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 317 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-85	12

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	7 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	FB		NR	

DATE 8-1-1945 TABLE NO. 316

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.40			
	A	.141			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.06		2.14	
	A	.017		.0119	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.36		6.97	
	A	.0352		.0387	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56002-785 Gr 3
Remarks: *Front contacts open on .026 inch.
Three 180 ohm coils.
Each winding to be tested separately.

Registry 1-2-7-30

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56002-785	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	180 ohms	8 F	7 B	N	R
COMPOUND	180 ohms				
ORDINARY ACTING	180 ohms	FB		NR	

DATE 8-1-1945 TABLE NO. 317

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-105 Gr 2
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 121 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-105	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	250 ohms	____ F	____ B	____ N	____ R
COMPOUND	250 ohms				
ORDINARY ACTING	____ ohms	6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 320

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	23.00			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.85		2.00	
	A	.0114		.008	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	5.75		6.35	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-701
Remarks: *Front contacts open on .040 inch.
Two 250 ohm coils.
Each winding to be tested separately.

Relay should be ordered from table 121
Registry 1-2-3-4

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	250 ohms	____ F	____ B	____ N	____ R
COMPOUND	250 ohms				
ORDINARY ACTING	____ ohms	6 FB		____ NR	

DATE 8-1-1945 TABLE NO. 321

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.52			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.10		2.17	
	A	.010		.007	
Min. pick-up	V	6.20			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	7.13		7.84	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 2
Remarks: *Front contacts open on .040 inch.
Three 310 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 327 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	310 ohms	5 F	4 B	____ N	____ R
COMPOUND	310 ohms				
ORDINARY ACTING	310 ohms	____ FB		____ NR	

DATE 8-1-1945 TABLE NO. 325

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.52			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.10		2.17	
	A	.010			
Min. pick-up	V	6.20			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	7.13		7.84	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 41
Remarks: *Front contacts open on .040 inch.
Three 310 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 327 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	41

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	310 ohms	5 F	4 B	____ N	____ R
COMPOUND	310 ohms				
ORDINARY ACTING	310 ohms	____ FB		____ NR	

DATE 8-1-1945 TABLE NO. 326

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.52			
	A	.092			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.10		2.17	
	A	.010		.007	
Min. pick-up	V	6.20			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	7.13		7.84	
	A	.023		.0253	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-785 Gr 7
Remarks: *Front contacts open on .040 inch.
Three 310 ohm coils.
Each winding to be tested separately.

Registry 1-2-7-31

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-785	7

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	310 ohms	5 F	4 B	____ N	____ R
COMPOUND	310 ohms				
ORDINARY ACTING	310 ohms	____ FB		____ NR	

DATE 8-1-1945 TABLE NO. 327

NYCS SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.24			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.740		.515	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.30		2.53	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .18 to .25 sec. at 5.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 10
Remarks: *Front contacts open on .040 inch.
Two 105 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 342 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	10

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	105 ohms	2 F	1 B	____ N	____ R
COMPOUND	105 ohms				
SLOW RELEASE	____ ohms	____ FB		____ NR	

DATE 8-1-1945 TABLE NO. 340

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.24			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	.740		.515	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.30		2.53	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .18 to .25 sec. at 5.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 42
Remarks: *Front contacts open on .040 inch.
Two 105 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 342 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	42

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	105 ohms	2 F 1 B ___ N ___ R
COMPOUND	105 ohms	
SLOW RELEASE	___ ohms	___ FB ___ NR

DATE 8-1-1945 TABLE NO. 341

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	9.24			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	7.40		.515	
	A	.007		.0049	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	2.30		2.53	
	A	.022		.0242	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .006 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .18 to .25 sec. at 5.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-713
Remarks: *Front contacts open on .040 inch.
Two 105 ohm coils.
Each winding to be tested separately.

Registry 1-2-3-25

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-713	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	105 ohms	2 F 1 B ___ N ___ R
COMPOUND	105 ohms	
SLOW RELEASE	___ ohms	___ FB ___ NR

DATE 8-1-1945 TABLE NO. 342

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	18.80			
	A	.114			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.31		1.615	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.70		5.17	
	A	.0285		.0314	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .08 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 32
Remarks: *Front contacts open on .040 inch.
Two 165 ohm coils.
Each winding to be tested separately.
Not gasketed.
See Table 347 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	32

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
NEUTRAL	165 ohms	___ F ___ B ___ N ___ R
COMPOUND	165 ohms	
SLOW RELEASE	___ ohms	6 FB ___ NR

DATE 8-1-1945 TABLE NO. 345

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.80			
	A	.114			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.31		1.615	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.70		5.17	
	A	.0285		.0314	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .08 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 43
Remarks: *Front contacts open on .040 inch.
Two 165 ohm coils.
Each winding to be tested separately.
Gasketed.
See Table 347 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	43

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	165 ohms	F	B	N	R
COMPOUND	165 ohms				
SLOW RELEASE	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. **346**

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	18.80			
	A	.114			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.31		1.615	
	A	.014		.0098	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.70		5.17	
	A	.0285		.0314	
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time .08 sec. at 10.0 volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-754
Remarks: *Front contacts open on .040 inch.
Two 165 ohm coils.
Each winding to be tested separately.

Registry 1-2-7-32

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-754	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL	165 ohms	F	B	N	R
COMPOUND	165 ohms				
SLOW RELEASE	ohms	6 FB		NR	

DATE 8-1-1945 TABLE NO. **347**

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	10.00			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.30		5.35	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.30		8.70	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .060 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.030 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 7.5 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-143
Remarks: *Front contacts open on .040 inch.
Two 50 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on back of board. Values shown are A.C.
Not gasketed. See Table 362.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-89	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER	50 ohms	F	B	N	R
TRANSFER	50 ohms				
	ohms	2 FB		NR	

DATE 8-1-1945 TABLE NO. **360**

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.30		5.35	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.30		8.70	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .060 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.030 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-143
Remarks: *Front contacts open on .040 inch.
Two 50 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on
back of board. Values shown are A.C.
Gasketed. See Table 362

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-139	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER TRANSFER	50 ohms 50 ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 361

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.3		5.35	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.30		8.70	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .060 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-143
Remarks: *Front contacts open on .040 inch.
Two 50 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on
back of board. Values shown are A.C.
Registry 1-2-3-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-721	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER TRANSFER	50 ohms 50 ohms ____ ohms	____ F	____ B	____ N	____ R
		2 FB		____ NR	

DATE 8-1-1945 TABLE NO. 362

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.30		5.50	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.30		9.00	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .030 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-92 Gr 1
Remarks: *Front contacts open on .040 inch.
Two 100 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on
back of board. Values shown are A.C.
Not gasketed. See Table 368

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-92	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER TRANSFER	100 ohms 100 ohms ____ ohms	____ F	____ B	____ N	____ R
		6 FB		____ NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.3		5.50	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.3		9.00	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .030 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.033* in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-140
Remarks: *Front contacts open on .040 inch.
Two 100 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on back of board. Values shown are A.C.
Gasketed. See Table 368

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-140	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER TRANSFER	100 ohms 100 ohms ohms	F	B	N	R
		6 FB		NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	10.0			
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.30		5.50	
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.30		9.00	
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .030 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.033* in.	1.5 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 7.5 amps. at 10 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-745
Remarks: *Front contacts open on .040 inch.
Two 100 ohm coils.
Normal volts - 10 A.C. Any frequency.
Rectifier Dwg No 54728-15, Gr 1 mounted on back of board. Values shown are A.C.
Registry 1-2-6-15

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-745	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POWER TRANSFER	100 ohms 100 ohms ohms	F	B	N	R
		6 FB		NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	171.50			
	A	.140			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.12		4.29	
	A	.005		.0033	
Min. pick-up	V				
	A				
Max. pick-up	V	42.80		47.80	
	A	.035		.039	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B S to S	XXXX	XXXX	.125 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 25
Remarks: Magnetic blow-outs.
One 1225 ohm coil and one .068 ohm coil.
Values shown are for 1225 ohm coil.
Overload set at 10.75 to 11.25 amperes.
Not gasketed.
See Table 386 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	18

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.068 ohms 1225 ohms ohms	F	2 B	N	R
		FB		NR	

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	171.50			
	A	.140			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.12		4.29	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V	42.80		47.80	
	A	.035		.039	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	.125 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-85 Gr 25
Remarks: Magnetic blow-outs.
One 1225 ohm coil and one .068 ohm coil.
Values shown are for 1225 ohm coil.
Overload set at 10.75 to 11.25 amperes.
Gasketed.
See Table 386 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-85	25

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.068 ohms 1225 ohms ____ ohms	____ F	2 B	____ N	____ R
		____ FB		____ NR	

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	171.50			
	A	.140			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	6.12		4.29	
	A	.005		.0035	
Min. pick-up	V				
	A				
Max. pick-up	V	42.80		47.80	
	A	.035		.039	
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral .010 in., Polar ____ in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time ____ sec. at ____ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ____ to ____	____ in.	____ oz.	____ in.
B S to S	XXXX	XXXX	.125 in.
P ____ to ____	____ in.	____ oz.	____ in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56001-785 Gr 1
Remarks: Magnetic blow-outs.
One 1225 ohm coil and one .068 ohm coil.
Values shown are for 1225 ohm coil.
Overload set at 10.75 to 11.25 amperes.

Registry 1-2-5-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	1	56001-785	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
NEUTRAL OVERLOAD	.068 ohms 1225 ohms ____ ohms	____ F	2 B	____ N	____ R
		____ FB		____ NR	

DATE 8-1-1945 TABLE NO. 386

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.20			
	A	.106			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.98		1.40	
	A	.0158		.0112	
Min. pick-up	V	2.25			
	A	.018			
Max. pick-up	V				
	A				
Max. working	V	3.30	3.30	3.63	3.63
	A	.0264	.0264	.029	.029
Max. polar pick-up and working	V	1.20	1.20	1.32	1.32
	A	.0096	.0096	.0106	.0106

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in multiple
on back of board.
Not gasketed.
See Table 442 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-57	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	125 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 401

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.20			
	A	.106			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.98		1.40	
	A	.0158		.0112	
Min. pick-up	V	2.25			
	A	.018			
Max. pick-up	V				
	A				
Max. working	V	3.30	3.30	3.63	3.63
	A	.0264	.0264	.029	.029
Max. polar pick-up and working	V	1.18	1.18	1.30	1.30
	A	.0094	.0094	.0104	.0104

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in multiple
on back of board.
Gasketed.
See Table 442 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-64	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	125 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 402

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.20			
	A	.106			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.98		1.40	
	A	.0158		.0112	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.30	3.30	3.63	3.63
	A	.0264	.0264	.029	.029
Max. polar pick-up and working	V	1.18	1.18	1.30	1.30
	A	.0094	.0094	.0104	.0104

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in multiple
on back of board.
Relay should be ordered from table 442
Registry 1-2-3-12

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	125 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 403

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	16.08			
	A	.0804			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.34		1.64	
	A	.0117		.0082	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.02	4.02	4.42	4.42
	A	.0201	.0201	.0221	.0221
Max. polar pick-up and working	V	1.44	1.44	1.58	1.58
	A	.0072	.0072	.0079	.0079

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .99 sec. at 6.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	___ oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.
Not gasketed.
See Table 413 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-57	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F ___ B ___ N ___ R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 411

NYCS
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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	16.08			
	A	.0804			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.34		1.64	
	A	.0117		.0082	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.02	4.02	4.42	4.42
	A	.0201	.0201	.0221	.0221
Max. polar pick-up and working	V	1.44	1.44	1.58	1.58
	A	.0072	.0072	.0079	.0079

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .99 sec. at 6.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.
Gasketed.
See Table 413 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-64	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 412

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	16.08			
	A	.0804			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.34		1.64	
	A	.0117		.0082	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.02	4.02	4.42	4.42
	A	.0201	.0201	.0221	.0221
Max. polar pick-up and working	V	1.44	1.44	1.58	1.58
	A	.0072	.0072	.0079	.0079

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .99 sec. at 6.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.

Registry 1-2-3-12

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-701	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 413

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	17.60			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.20		1.54	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40	4.40	4.84	4.84
	A	.022	.022	.0242	.0242
Max. polar pick-up and working	V	1.50	1.50	1.50	1.50
	A	.0075	.0075	.0075	.0075

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .89 sec. at 6.15 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.035** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-193
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .040 inch.
Two 100 ohm coils connected in series
on back of board.
Not gasketed.
See Table 416 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-58	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4 FB		8 NR	

DATE 8-1-1945 TABLE NO. 414

NYCS
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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.20		1.54	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40	4.40	4.84	4.84
	A	.022	.022	.0242	.0242
Max. polar pick-up and working	V	1.50	1.50	1.66	1.66
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .89 sec. at 6.15 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.035** in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-193
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .040 inch.
Two 100 ohm coils connected in series
on back of board.
Gasketed.
See Table 416 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	56003-62	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4	FB	8	NR

DATE 8-1-1945 TABLE NO. 415

NYCS
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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	17.60			
	A	.088			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.20		1.54	
	A	.011		.0077	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.40	4.40	4.84	4.84
	A	.022	.022	.0242	.0242
Max. polar pick-up and working	V	1.50	1.50	1.66	1.66
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .89 sec. at 6.15 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.035** in.	oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-193
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .040 inch.
Two 100 ohm coils connected in series
on back of board.

Registry 1-2-5-29

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	56003-707	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		4	FB	8	NR

DATE 8-1-1945 TABLE NO. 416

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.60			
	A	.128			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.90		2.04	
	A	.0145		.0102	
Min. pick-up	V	4.40		4.84	
	A	.022		.0242	
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.032	.032	.0352	.0352
Max. polar pick-up and working	V	1.50	1.50	1.66	1.66
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time .67 sec. at 7.95 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-190
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.
Not gasketed.
See Table 422 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	56003-56	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ohms ohms	F	B	N	R
		8	FB	4	NR

DATE 8-1-1945 TABLE NO. 420

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.60			
	A	.128			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.90		2.04	
	A	.0145		.0102	
Min. pick-up	V	4.40		4.84	
	A	.022		.0242	
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.032	.032	.0352	.0352
Max. polar pick-up and working	V	1.50	1.50	1.66	1.66
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .67 sec. at 7.95 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-190
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.
Gasketed.
See Table 422 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-70	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		4 NR	

DATE 8-1-1945 TABLE NO. 421

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.60			
	A	.128			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.90		2.04	
	A	.0145		.0102	
Min. pick-up	V	4.40			
	A	.022			
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.032	.032	.0352	.0352
Max. polar pick-up and working	V	1.50	1.50	1.66	1.66
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .67 sec. at 7.95 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-710
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 100 ohm coils connected in series
on back of board.

Registry 1-2-7-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-710	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	200 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		4 NR	

DATE 8-1-1945 TABLE NO. 422

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.30			
	A	.118			
Min. drop-away without contact pressure	V	.80			
	A	.0033			
Min. drop-away	V	1.97		1.39	
	A	.0082		.0058	
Min. pick-up	V	6.19	6.19		
	A	.0258	.0258		
Max. pick-up	V	6.95			
	A	.029			
Max. working	V	7.07	7.07	7.78	7.78
	A	.0295	.0295	.0324	.0324
Max. polar pick-up and working	V	4.29	4.29	4.72	4.72
	A	.0179	.0179	.0197	.0197

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 6.95 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.055 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.065 in.	3 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3557 Indiv. ______
Remarks: Minimum compression .050 inch for
neutral contacts and .055 for polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PNP-54		C-16796-3	226775

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	240 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 424

NYGS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.70			
	A	.092			
Min. drop-away without contact pressure	V	1.059			
	A	.0026			
Min. drop-away	V	2.56		1.80	
	A	.0064		.0045	
Min. pick-up	V	8.04	8.04		
	A	.0201	.0201		
Max. pick-up	V	9.02			
	A	.0226			
Max. working	V	9.18	9.18	10.098	10.098
	A	.023	.023	.0253	.0253
Max. polar pick-up and working	V	5.57	5.57	6.12	6.12
	A	.0139	.0139	.0153	.0153

Min. physical air gap; Neutral .013 in., Polar .013 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time .9 sec. at 9.02 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.055 in.	3 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.065 in.	3 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3557 Indiv. ______
Remarks: Minimum compression .050 inch for neutral contacts and .055 inch for polar contacts.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
U.S.&S.Co.	PNP-54		C-16796-3	230587

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	400 ohms ohms ohms	___F ___B ___N ___R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 430

NYGS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.0528			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	4.00		2.80	
	A	.0079		.0056	
Min. pick-up	V	4.50			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.0132	.0132	.0145	.0145
Max. polar pick-up and working	V	2.40	2.40	2.64	2.64
	A	.0048	.0048	.0053	.0053

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in series on back of board.
See Table 442 for new replacement relay.
Not gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	56003-57	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	500 ohms ohms ohms	___F ___B ___N ___R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 440

NYGS
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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.0528			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.95		2.80	
	A	.0079		.0056	
Min. pick-up	V	4.50			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.0132	.0132	.0145	.0145
Max. polar pick-up and working	V	2.35	2.35	2.60	2.60
	A	.0047	.0047	.0052	.0052

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in series on back of board.
Gasketed.
See Table 442 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	56003-64	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS
POLARIZED ORDINARY ACTING	500 ohms ohms ohms	___F ___B ___N ___R 4 FB 4 NR

DATE 8-1-1945 TABLE NO. 441

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.0528			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.95		2.80	
	A	.0079		.0056	
Min. pick-up	V	4.50			
	A	.009			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.0132	.0132	.0145	.0145
Max. polar pick-up and working	V	2.35	2.35	2.60	2.60
	A	.0047	.0047	.0052	.0052

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.0 sec. at 9.85 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 250 ohm coils connected in series.
on back of board.

Registry 1-2-3-12

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-701	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED ORDINARY ACTING	500 ohms ohms ohms	___F 4 FB	___B	___N 4 NR	___R

DATE 8-1-1945 TABLE NO. 442

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.44			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.90		1.34	
	A	.016		.0112	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.36	3.36	3.70	3.70
	A	.028	.028	.0308	.0308
Max. polar pick-up and working	V	1.20	1.20	1.32	1.32
	A	.010	.010	.011	.011

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.07 sec. at 5.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv 56003-66 Gr 2
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 60 ohm coils connected in series
on back of board.
Not gasketed.
See Table 453 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-66	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	120 ohms ohms ohms	___F 4 FB	___B	___N 4 NR	___R

DATE 8-1-1945 TABLE NO. 451

NYCS
SC-48

INSTRUCTIONS 393
D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.44			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.90		1.34	
	A	.016		.0112	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.36	3.36	3.70	3.70
	A	.028	.028	.0308	.0308
Max. polar pick-up and working	V	1.20	1.20	1.32	1.32
	A	.010	.010	.011	.011

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.02 sec. at 5.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-71
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 60 ohm coils connected in series
on back of board.
Gasketed.
See Table 453 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-71	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	120 ohms ohms ohms	___F 4 FB	___B	___N 4 NR	___R

DATE 8-1-1945 TABLE NO. 452

NYCS SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	13.44			
	A	.112			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	1.90		1.34	
	A	.016		.0112	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	3.36	3.36	3.70	3.70
	A	.028	.028	.0308	.0308
Max. polar pick-up and working	V	1.20	1.20	1.32	1.32
	A	.010	.010	.011	.011

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.02 sec. at 5.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-709
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 60 ohm coils connected in series
on back of board.

Registry 1-2-6-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-709	2

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	120 ohms ohms ohms	F 4 FB	B	N 4 NR	R

DATE 8-1-1945 TABLE NO. 453

NYCS SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.100			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.59		2.34	
	A	.013		.0085	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.59	7.59
	A	.025	.025	.0275	.0275
Max. polar pick-up and working	V	2.35	2.35	2.59	2.59
	A	.0085	.0085	.0094	.0094

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .4 sec. at 12.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.68 sec. at 10.35 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.033** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 138 ohm coils connected in series
on back of board.
Not gasketed.
See Table 458 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-57	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	276 ohms ohms ohms	F 4 FB	B	N 4 NR	R

DATE 8-1-1945 TABLE NO. 456

NYCS SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.100			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.59		2.34	
	A	.013		.0085	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.59	7.59
	A	.025	.025	.0275	.0275
Max. polar pick-up and working	V	2.35	2.35	2.59	2.59
	A	.0085	.0085	.0094	.0094

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .4 sec. at 12.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.68 sec. at 10.35 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-150
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 138 ohm coils connected in series
on back of board.
Gasketed.
See Table 458 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-63	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	276 ohms ohms ohms	F 4 FB	B	N 4 NR	R

DATE 8-1-1945 TABLE NO. 457

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	27.60			
	A	.100			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.59		2.34	
	A	.013		.0085	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.90	6.90	7.59	7.59
	A	.025	.025	.0275	.0275
Max. polar pick-up and working	V	2.35	2.35	2.59	2.59
	A	.0085	.0085	.0094	.0094

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time .4 sec. at 12.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.68 sec. at 10.35 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-708
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 138 ohm coils connected in series
on back of board.

Registry 1-2-5-30

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-708	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	276 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 458

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.70			
	A	.054			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.70		2.57	
	A	.0077		.0054	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.0135	.0135	.0148	.0148
Max. polar pick-up and working	V	2.60	2.60	2.86	2.86
	A	.0055	.0055	.006	.006

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time Min. .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.1 sec. at 9.65 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 11
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 238 ohm coils connected in series
on back of board.
Not gasketed.
See Table 472 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	11

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	476 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 470

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.70			
	A	.054			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.70		2.57	
	A	.0077		.0054	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.0135	.0135	.0148	.0148
Max. polar pick-up and working	V	2.60	2.60	2.86	2.86
	A	.0055	.0055	.006	.006

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time Min. .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.1 sec. at 9.65 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ____)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 20
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 238 ohm coils connected in series
on back of board.
Gasketed.
See Table 472 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	20

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	476 ohms ____ ohms ____ ohms	____ F	____ B	____ N	____ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 471

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.70			
	A	.054			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.70		2.57	
	A	.0077		.0054	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.40	6.40	7.04	7.04
	A	.0135	.0135	.0148	.0148
Max. polar pick-up and working	V	2.60	2.60	2.86	2.86
	A	.0055	.0055	.006	.006

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time Min. .08 sec. at 10.0 volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 1.1 sec. at 9.65 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-709
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 238 ohm coils connected in series
on back of board.

Registry 1-2-6-33

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-709	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED SLOW RELEASE	476 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 472

NYCS
SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.80		2.00	
	A	.013		.0091	
Min. pick-up	V	4.40			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.030	.030	.033	.033
Max. polar pick-up and working	V	1.65	1.65	1.85	1.85
	A	.0075	.0075	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-213
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Test for holding at .036 amperes.
Two 110 ohm coils connected in series
on back of board. See Table 478.
Not gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56004-54	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	220 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		6 FB		4 NR	

DATE 8-1-1945 TABLE NO. 476

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.80		2.00	
	A	.013		.0091	
Min. pick-up	V	4.40			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.030	.030	.033	.033
Max. polar pick-up and working	V	1.65	1.65	1.85	1.85
	A	.0075	.0075	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-213
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Test for holding at .036 amperes.
Two 110 ohm coils connected in series
on back of board. See Table 478.
Gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56004-56	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED RETAINED NEUTRAL	220 ohms ___ ohms ___ ohms	___ F	___ B	___ N	___ R
		6 FB		4 NR	

DATE 8-1-1945 TABLE NO. 477

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	26.40			
	A	.120			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.80		2.00	
	A	.013		.0091	
Min. pick-up	V	4.40			
	A	.020			
Max. pick-up	V				
	A				
Max. working	V	6.60	6.60	7.26	7.26
	A	.030	.030	.033	.033
Max. polar pick-up and working	V	1.65	1.65	1.85	1.85
	A	.0075	.0075	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.022* in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 10M-213
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two 110 ohm coils connected in series
on back of board.

Registry 1-2-5-31

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56004-702	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	220 ohms	F	B	N	R
RETAINED	ohms				
NEUTRAL	ohms	6 FB		4 NR	

DATE 8-1-1945 TABLE NO. 478

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.32			
	A	.208			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.66	
	A	.023		.0161	
Min. pick-up	V	5.78			
	A	.035			
Max. pick-up	V				
	A				
Max. working	V	8.58	8.58	9.44	9.44
	A	.052	.052	.0572	.0572
Max. polar pick-up and working	V	1.98	1.98	2.09	2.09
	A	.012	.012	.0132	.0132

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.55 sec. at 12.0 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.022* in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 14
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
One coil used to operate normal and the
other coil used to operate reverse.
Relay to be tested the same way as used.
Not gasketed. See Table 503.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	14

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	165 ohms	F	B	N	R
COMPOUND	165 ohms				
	ohms	8 FB		4 NR	

DATE 8-1-1945 TABLE NO. 501

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.32			
	A	.208			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.66	
	A	.023		.0161	
Min. pick-up	V	5.78			
	A	.035			
Max. pick-up	V				
	A				
Max. working	V	8.58	8.58	9.44	9.44
	A	.052	.052	.0572	.0572
Max. polar pick-up and working	V	1.98	1.98	2.09	2.09
	A	.012	.012	.0132	.0132

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.55 sec. at 12.0 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F SIC	to	S	.022* in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 21
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
One coil used to operate normal and the
other coil used to operate reverse.
Relay to be tested the same way as used.
Gasketed. See Table 503.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	21

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED	165 ohms	F	B	N	R
COMPOUND	165 ohms				
	ohms	8 FB		4 NR	

DATE 8-1-1945 TABLE NO. 502

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.32			
	A	.208			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.80		2.66	
	A	.023		.0161	
Min. pick-up	V	5.78			
	A	.035			
Max. pick-up	V				
	A				
Max. working	V	8.58	8.58	9.44	9.44
	A	.052	.052	.0572	.0572
Max. polar pick-up and working	V	1.98	1.98	2.09	2.09
	A	.012	.012	.0132	.0132

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.55 sec. at 12.0 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 3
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
One coil used to operate normal and the
other coil used to operate reverse.
Relay to be tested the same way as used.
Registry 1-2-8-9

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	165 ohms 165 ohms ___ ohms	___ F	___ B	___ N	___ R
		8 FB		4 NR	

DATE 8-1-1945 TABLE NO. 503

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	16.90	28.80		
	A	.094	.144		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.16	4.10	1.51	2.70
	A	.012	.0205	.0084	.0135
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.23	7.20	4.66	7.92
	A	.0235	.036	.0259	.0396
Max. polar pick-up and working	V	1.62	2.60	1.78	2.86
	A	.009	.013	.0099	.0143

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.82 sec. at 6.3 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 17
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position
of polars. Not gasketed. See Table 512
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	17

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 510

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	16.90	28.80		
	A	.094	.144		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.16	4.10	1.51	2.70
	A	.012	.0205	.0084	.0135
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.23	7.20	4.66	7.92
	A	.0235	.036	.0259	.0396
Max. polar pick-up and working	V	1.62	2.60	1.78	2.86
	A	.009	.013	.0099	.0143

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.82 sec. at 6.3 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 19
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position
of polars. Gasketed. See Table 512
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	19

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 511

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE 393A
8-1-1945
D. C. RELAYS

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	16.90	28.80		
	A	.094	.144		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.16	4.10	1.51	2.70
	A	.012	.0205	.0084	.0135
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.23	7.20	4.66	7.92
	A	.0235	.036	.0259	.0396
Max. polar pick-up and working	V	1.62	2.60	1.78	2.86
	A	.009	.013	.0099	.0143

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time 0.82 sec. at 6.3 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 4
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position of
polar armature. Registry 1-2-8-10
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	4

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 512

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	18.72	39.20		
	A	.104	.196		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70	5.20	1.89	3.64
	A	.015	.026	.0105	.0182
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.68	9.80	5.15	10.78
	A	.026	.049	.0286	.0539
Max. polar pick-up and working	V	1.26	2.20	1.39	2.42
	A	.007	.011	.0077	.0121

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time 0.73 sec. at 7.8 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 3
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position
of polars. Not gasketed. See Table 515
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	3

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	3 F	3 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 513

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	18.72	39.20		
	A	.104	.196		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70	5.20	1.89	3.64
	A	.015	.026	.0105	.0182
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.68	9.80	5.15	10.78
	A	.026	.049	.0286	.0539
Max. polar pick-up and working	V	1.26	2.20	1.39	2.42
	A	.007	.011	.0077	.0121

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ____ at ____ volts
Release time ____ sec. at ____ volts
Pick-up time ____ sec. at ____ volts
Max. reversal time 0.73 sec. at 7.8 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022 in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) ___ amps. at ___ volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 22
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position
of polars. Gasketed. See Table 515
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	22

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	3 F	3 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 514

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE (1)	MANUFACTURE (2)	FIELD (1)	FIELD (2)
Initial charge	V	18.70	39.20		
	A	.104	.196		
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	2.70	5.20	1.89	3.64
	A	.015	.026	.0105	.0182
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	4.68	9.80	5.15	10.78
	A	.026	.049	.0286	.0539
Max. polar pick-up and working	V	1.26	2.20	1.39	2.42
	A	.007	.011	.0077	.0121

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.73 sec. at 7.8 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.022 in.	1.75 oz.	.050 in.
B	S	to	S	XXXX	XXXX	.020 in.
P	SIC	to	S	.030 in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 5
Remarks: For 180 ohm test from 1D to 6D.
For 200 ohm test from 1C to 6C.
Positive on 6C or 6D for proper position
of polar armature. Registry 1-2-8-11
(1) Values shown are for 180 ohm winding.
(2) Values shown are for 200 ohm winding.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	5

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	180 ohms 200 ohms ___ ohms	3 F	3 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 515

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.40			
	A	.172			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	4.00		2.80	
	A	.020		.014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.60	8.60	9.46	9.46
	A	.043	.043	.0473	.0473
Max. polar pick-up and working	V	1.60	1.60	1.76	1.76
	A	.008	.008	.0088	.0088

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.45 sec. at 12.9 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.022* in.	1.75 oz.	.125 in.
B	S	to	S	XXXX	XXXX	.095 in.
P	SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 12
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two contacts equipped with magnetic blowouts
Double winding. Values shown are for either
winding. Two 200 ohm pairs of coils.
Not gasketed. See Table 523.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	12C

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	3 F	2 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 521

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.40			
	A	.172			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	4.00		2.80	
	A	.020		.014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.60	8.60	9.46	9.46
	A	.043	.043	.0473	.0473
Max. polar pick-up and working	V	1.60	1.60	1.76	1.76
	A	.008	.008	.0088	.0088

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.45 sec. at 12.9 volts

CONTACTS				COMPRESSION	PRESSURE	MIN. OPENING
F	SIC	to	S	.022* in.	1.75 oz.	.125 in.
B	S	to	S	XXXX	XXXX	.095 in.
P	SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 23C
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two contacts equipped with magnetic blowouts.
Double winding. Values shown are for either
winding. Two 200 ohm pairs of coils.
Gasketed. See Table 523.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	23C

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	3 F	2 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 522

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	34.40			
	A	.172			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	4.00		2.80	
	A	.020		.014	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	8.60	8.60	9.46	9.46
	A	.043	.043	.0473	.0473
Max. polar pick-up and working	V	1.60	1.60	1.76	1.76
	A	.008	.008	.0088	.0088

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.45 sec. at 12.9 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.125 in.
B S to S	XXXX	XXXX	.095 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 6
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Two contacts equipped with magnetic blowouts
Double winding. Values shown are of either winding. Two 200 ohm pairs of coils.
Registry 1-2-8-12

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	6

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	3 F	2 B	___ N	___ R
		2 FB		4 NR	

DATE 8-1-1945 TABLE NO. 523

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.80			
	A	.144			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.015		.0105	
Min. pick-up	V	6.60			
	A	.033			
Max. pick-up	V				
	A				
Max. working	V	7.20	7.20	7.92	7.92
	A	.036	.036	.0396	.0396
Max. polar pick-up and working	V	1.50	1.50	1.65	1.65
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.51 sec. at 10.8 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 1
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Double winding. Values shown are for either winding.
Positive on 6D-Normal. Positive on 1D-Reverse
Not gasketed. See Table 526.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 524

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SC-48

INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	28.80			
	A	.144			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.015		.0105	
Min. pick-up	V	6.60			
	A	.033			
Max. pick-up	V				
	A				
Max. working	V	7.20	7.20	7.92	7.92
	A	.036	.036	.0396	.0396
Max. polar pick-up and working	V	1.50	1.50	1.65	1.65
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.51 sec. at 10.8 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 24
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Double winding. Values shown are for either winding.
Positive on 6D-Normal. Positive on 1D-Reverse
Gasketed. See Table 526.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	24

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	___ F	___ B	___ N	___ R
		4 FB		4 NR	

DATE 8-1-1945 TABLE NO. 525

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	28.80			
	A	.144			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.015		.0105	
Min. pick-up	V	6.60			
	A	.033			
Max. pick-up	V				
	A				
Max. working	V	7.20	7.20	7.92	7.92
	A	.036	.036	.0396	.0396
Max. polar pick-up and working	V	1.50	1.50	1.65	1.65
	A	.0075	.0075	.0083	.0083

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.51 sec. at 10.8 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F SIC to S	.022* in.	1.75 oz.	.090 in.
B S to S	XXXX	XXXX	.060 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 175 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 7
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Double winding. Values shown are for
either winding. Positive on 6D-Normal.
Positive on 1D-Reverse.
Registry 1-2-8-13

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	7

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	200 ohms 200 ohms ___ ohms	___ F 4	___ B FB	___ N 4	___ R NR

DATE 8-1-1945 TABLE NO. 526

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.084			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.60		2.52	
	A	.012		.0084	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30	6.30	6.93	6.93
	A	.021	.021	.0231	.0231
Max. polar pick-up and working	V	2.28	2.28	2.52	2.52
	A	.0076	.0076	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time 0.5 sec. at 10.0 volts
Max. reversal time 0.64 sec. at 8.55 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P SIC to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 16
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Values shown are for 300 ohm winding.
Maximum pick-up of .14 winding - 1.3 Amps.
Two 150 ohm coils and two .07 ohm coils.
Not gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	16

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	.14 ohms 300 ohms ___ ohms	___ F 4	___ B FB	___ N 4	___ R NR

DATE 8-1-1945 TABLE NO. 540

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V	25.20			
	A	.084			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30	6.30	6.93	6.93
	A	.021	.021	.0231	.0231
Max. polar pick-up and working	V	2.28	2.28	2.52	2.52
	A	.0076	.0076	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time 0.64 sec. at 8.55 volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	.022* in.	1.75 oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P S to S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. ______
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Values shown are for 300 ohm winding.
Maximum pick-up of .14 winding - 1.3 Amps.
Two 150 ohm coils and two .07 ohm coils.
Gasketed.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	26

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	.14 ohms 300 ohms ___ ohms	___ F 4	___ B FB	___ N 4	___ R NR

DATE 8-1-1945 TABLE NO. 541

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.20			
	A	.084			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30	6.30	6.93	6.93
	A	.021	.021	.0231	.0231
Max. polar pick-up and working	V	2.28	2.28	2.52	2.52
	A	.0076	.0076	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time Max 0.5 sec. at 10.0 volts
Max. reversal time 0.64 sec. at 8.55 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F S	to	S	.022* in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-85 Gr 18
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Values shown are for 300 ohm winding.
Maximum pick-up of .14 winding - 1.3 Amps.
Two 150 ohm coils and two .07 ohm coils.
Gasketed. See Table 543 for new relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-85	18

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	.14 ohms 300 ohms ohms	2 F	B	N	R
			2 FB	4 NR	

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	25.20			
	A	.084			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V	3.00		2.10	
	A	.010		.007	
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V	6.30	6.30	6.93	6.93
	A	.021	.021	.0231	.0231
Max. polar pick-up and working	V	2.28	2.28	2.52	2.52
	A	.0076	.0076	.0084	.0084

Min. physical air gap; Neutral .010 in., Polar .008 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time Max 0.5 sec. at 10.0 volts
Max. reversal time 0.64 sec. at 8.55 volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F S	to	S	.022* in.	1.75 oz.	.050 in.
B S	to	S	XXXX	XXXX	.020 in.
P SIC	to	S	.030** in.	1.75 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. 56003-785 Gr 1
Remarks: *Front contacts open on .026 inch.
**Polar contacts open on .033 inch.
Values shown are for 300 ohm winding.
Maximum pick-up of .14 winding - 1.3 Amps.
Two 150 ohm coils and two .07 ohm coils.
Registry 1-2-5-28

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	56003-785	1

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLARIZED COMPOUND	.14 ohms 300 ohms ohms	2 F	B	N	R
			2 FB	4 NR	

DATE 8-1-1945 TABLE NO. 543

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INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	37.50			
	A	.060			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V	9.40	9.40	10.34	10.34
	A	.015	.015	.0165	.0165

Min. physical air gap; Neutral ______ in., Polar .016 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS			COMPRESSION	PRESSURE	MIN. OPENING
F	to		in.	oz.	in.
B	to		XXXX	XXXX	in.
P SIC	to	S	.065 in.	3 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3167 Indiv. ______
Remarks: Minimum compression .050 inch.
Double winding. Values shown are for either winding. Test each winding separately.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PP-51		C-16676-3	108946

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLAR	625 ohms 625 ohms ohms	F	B	8 N	7 R
			FB		NR

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	29.00			
	A	.036			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V	7.30	7.30	8.00	8.00
	A	.0091	.0091	.010	.010

Min. physical air gap; Neutral ______ in., Polar .016 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P SIC to S	.065 in.	3 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3167 Indiv. ______
Remarks: Minimum compression .050 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PP-51		C-16676-6	108945

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLAR	800 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms		___ FB	8 NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V	36.50			
	A	.028			
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V	9.10	9.10	10.00	10.00
	A	.007	.007	.0077	.0077

Min. physical air gap; Neutral ______ in., Polar .016 in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F ______ to ______	______ in.	______ oz.	______ in.
B ______ to ______	XXXX	XXXX	______ in.
P SIC to S.	.065 in.	3 oz.	.050 in.

Contact cap'y (Non-ind. load) 4 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. 3167 Indiv. ______
Remarks: Minimum compression .050 inch.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
U.S.&S.Co.	PP-51		C-16676-6	220181

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
POLAR	1300 ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms		___ FB	8 NR	

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INSTRUCTIONS 393

D.C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE Normal	MANUFACTURE Reverse	FIELD Normal	FIELD Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 39 to 41 at 10.8 to 13.2 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	______ in.	______ oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P ______ to ______	______ in.	______ oz.	______ in.

Contact cap'y (Non-ind. load) 10 amps. at 30 volts (Par. ___)
Manuf., Spec; Gen. GES 1-74 Indiv. None
Remarks: Minimum starting 8 volts.

See Table 601 for new replacement relay.

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PC.
G.R.S.Co.	B	2	57261-50	4

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
MOTOR FLASHER	___ ohms	___ F	___ B	___ N	___ R
	___ ohms				
	___ ohms		4 FB	___ NR	

DATE 8-1-1945 TABLE NO. **600**

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute 39 to 41 at 10.8 to 13.2 volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F S to S	in.	oz.	.050 in.
B S to S	XXXX	XXXX	.020 in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) 10 amps. at 32 volts (Par. ___)
Manuf., Spec; Gen. GES 1-54 Indiv. None
Remarks: Minimum starting 8 volts.

Registry 1-2-6-7

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.
G.R.S.Co.	B	2	57261-701	4

Magnetic structure: Silicon Steel

KIND	RESISTANCE	CONTACTS			
MOTOR FLASHER	ohms ohms ohms	F	B	N	R
		4 FB		NR	

DATE 8-1-1945 TABLE NO. 601

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B to	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) ___ amps. at ___ volts (Par. ___)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.

Magnetic structure:

KIND	RESISTANCE	CONTACTS			
	ohms ohms ohms	F	B	N	R
		FB		NR	

DATE ______ TABLE NO. ______

NYCS
SC-48

INSTRUCTIONS 393

D. C. RELAY REQUIREMENTS

OPERATING CHARACTERISTICS		MANUFACTURE		FIELD	
		Normal	Reverse	Normal	Reverse
Initial charge	V				
	A				
Min. drop-away without contact pressure	V				
	A				
Min. drop-away	V				
	A				
Min. pick-up	V				
	A				
Max. pick-up	V				
	A				
Max. working	V				
	A				
Max. polar pick-up and working	V				
	A				

Min. physical air gap; Neutral ______ in., Polar ______ in.
Flashes per minute ______ at ______ volts
Release time ______ sec. at ______ volts
Pick-up time ______ sec. at ______ volts
Max. reversal time ______ sec. at ______ volts

CONTACTS	COMPRESSION	PRESSURE	MIN. OPENING
F to	in.	oz.	in.
B to	XXXX	XXXX	in.
P to	in.	oz.	in.

Contact cap'y (Non-ind. load) ___ amps. at ___ volts (Par. ___)
Manuf., Spec; Gen. ______ Indiv. ______
Remarks:

MANUFACTURE	TYPE OR STYLE	SIZE	DRAWING	GR. OR PG.

Magnetic structure:

KIND	RESISTANCE	CONTACTS			
	ohms ohms ohms	F	B	N	R
		FB		NR	

DATE ______ TABLE NO. ______

1 AUTOMATIC SIGNAL TERRITORY

(a) Home signal aspect:
Top unit 3 indications.
Middle unit (if used) in conformity with automatic block system of which it is a part.
Bottom unit 2 indications.

(b) Home signal governing limits:
Home signal, to block signal next in advance governing in same direction.

2 CONTROL REQUISITES

(a) Top unit of home signals should clear automatically upon approach of train providing the block is unoccupied, all opposing and conflicting home signals indicate "STOP", and all track sections in opposing and conflicting routes within interlocking limits are unoccupied.

(b) If top unit fails to clear under conditions stated in 2(a), the manipulation of time release at the crossing shall cause all home signals governing opposing and conflicting movements to give "STOP" indication, it shall cut out the approach controls on crossing roads, and after time release period of not less than 3 minutes has elapsed, it shall cause the bottom unit to give "PROCEED AT RESTRICTED SPEED" indication provided all track sections in opposing and conflicting routes within interlocking limits are unoccupied. The signal shall automatically assume the "STOP" position as the rear end of train passes it.

3 MANUAL BLOCK SIGNAL TERRITORY

(a) Home signal aspects:
Top unit 2 indications.
Middle unit (if used) inoperative.
Bottom unit 2 indications or inoperative.

(b) Home signal governing limits:
Home signal, only to signal governing opposing movement.

4 CONTROL REQUISITES

(a) Top unit of home signal should clear automatically upon approach of train providing the track circuited section is unoccupied, all opposing and conflicting home signals indicate "STOP" and all track sections in opposing and conflicting routes within interlocking limits are unoccupied.

(b) If bottom unit is inoperative and top unit fails to clear under conditions 4(a) manipulation of time release shall cause all home signals governing opposing and conflicting movements to give "STOP" indication, it shall cut out approach controls on crossing roads, and after time release period of not less than 3 minutes has elapsed, it shall cause the top unit to give "PROCEED" indication, providing all track sections in opposing and conflicting routes within interlocking limits are unoccupied.

(c) If bottom unit is operative and top unit fails to clear under conditions 4(a) manipulation of time release at the crossing shall cause all home signals governing opposing and conflicting movements to give "STOP" indication, it shall cut out the approach controls on crossing roads, and after time release period of not less than 3 minutes has elapsed, it shall cause the bottom arm to give "PROCEED AT RESTRICTED SPEED" indication, provided all track sections in opposing and conflicting routes within interlocking limits are unoccupied. The signal shall automatically assume the "STOP" position as the rear end of train passes it.

5 IN EITHER AUTOMATIC OR MANUAL BLOCK TERRITORY

(a) Distant signal aspects and indications:
Top unit 3 indications.
Top unit shall give "PREPARE TO STOP AT NEXT SIGNAL" indication, or more restrictive as the block signal system may require when the block between it and the home signal in advance (governing in the same direction) is unoccupied provided the home signal is giving the "STOP" indication. It shall give a more favorable indication than "PREPARE TO STOP AT NEXT SIGNAL" when the block is unoccupied provided the top unit of the home signal gives other than the "STOP" indication.

6 HAND SIGNALING

(a) When neither top or bottom signal unit clears, the time release shall be operated provided there are no trains approaching on any opposing or conflicting route. After manipulating time release, if a signal does not then clear trainmen must wait not less than 3 minutes before giving "PROCEED" hand signal. Hand signal must be given from the crossing but not until the trainman has again observed that no trains are approaching on any opposing or conflicting route.

(b) Where derails are in use, they must be properly lined and where smash boards are used they must be cleared, by hand, before hand signals are given. After train or engine has passed, derails or smash boards must be restored to normal position.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL. R.R.

401

ISSUE	DATE
1	4-28-1936

AUTOMATIC INTERLOCKING ASPECTS CIRCUIT AND OPERATION REQUIREMENTS

Approved by Representatives of Lines shown.
J C Mock
Chairman

DEPT. 41
JUL
3
1936
U.S.&S. CO.

Inst'ns 405 (7-22-41) voids references to sealing compounds included in N.Y.C.R.R. Inst'ns, Index P-1.

ITEM	USE	ORDERING REFERENCE
1	For sealing against the entrance of moisture at cable sleeves, potheads, etc. (750 volts or less).	FUSIBLE ASPHALTIC BASE SEALING COMPOUND A.A.R. Signal Section Spec. 184 1, 5 and 55 Gal. Containers
2	For sealing against the entrance of moisture at cable sleeves, potheads, etc. (750 to 35,000 volts).	MINERALLAC No. 78 Minerallac Electric Co. Chicago, Ill. 1 Gal. Containers
3	For closing wire openings in apparatus housings, etc., against the entrance of insects, rodents and foreign matter.	COLD APPLICATION COMPOUND A.A.R. Signal Section Spec. 188 10 Lb. Containers
4	For sealing inductor cases and coils against the entrance of moisture.	ADAMS GRIPTITE CEMENT Adams Paint Co. Cleveland, O. 50 Lb. Containers
5	For sealing joints between metal parts, lenses in signals, etc.	VULCATEX-KNIFE GRADE "C" Light Gray A. C. Horn Co., Long Island City, N. Y. 1 Gal. Containers
6	For sealing around relay cores, etc., in relay tops.	PAROLITE General Railway Signal Co. 10 Lb. Containers
7	For filling recesses in terminal blocks.	HERMASTIC ENAMEL No. 104 Wailes Dove Hermiston Corp. Westfield, N. J. 10 Lb. Containers
8	For protecting wire joints in rubber covered wire.	CEMENT-RUBBER Goodyear No. 35 Cold Patching Akron, Ohio 1 Pint Containers
9	For sealing around binding posts in relay tops, etc.	CEMENT GLUE-20TH. CENTURY Marine Brand-Grade "A" L. W. Ferdinand & Co., Inc. 599 Albany St., Boston, Mass. 1 Pint Containers
10	For sealing relays where means for wire seal is not provided.	SEALING WAX ____Lbs. (Commercial sticks)
11	For sealing wires at soil pipe.	ASPHALTUM PETROLEUM COMPOUND R.S.A. Spec. 6117 25 Gal. Containers

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

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P.& L.E.R.R.
RUTL.R.R.

405

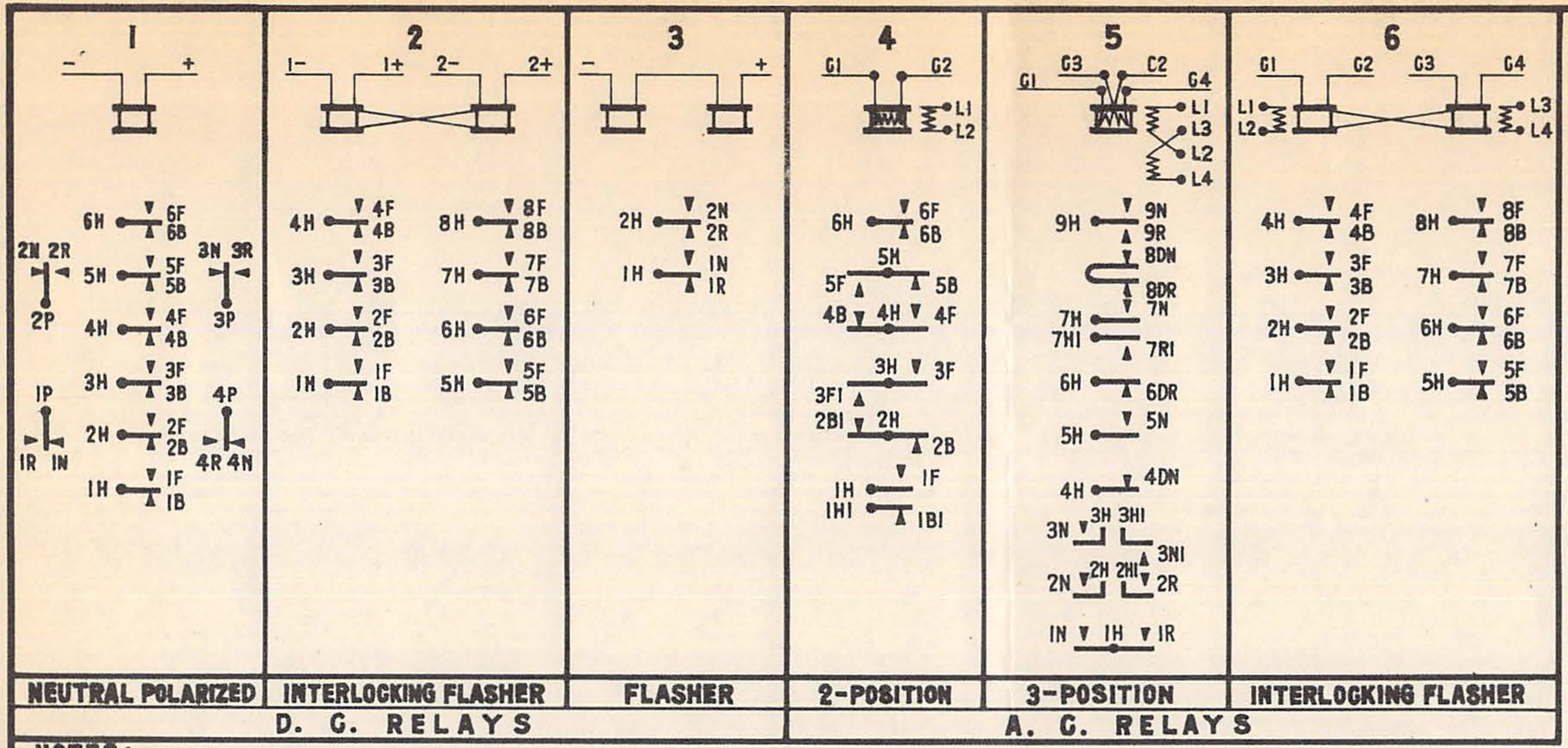
1 | 7-22-1941

SEALING COMPOUNDS

ORDERING REFERENCES AND INSTRUCTIONS

Approved by Representatives of Lines shown.

JJCorcoran
Chairman


1
− +
6H 6F 6B
2N 2R
3N 3R
5H 5F 5B
2P
3P
4H 4F 4B
3H 3F 3B
1P
4P
2H 2F 2B
1R 1N
4R 4N
1H 1F 1B
2
1− 1+ 2− 2+
4H 4F 4B
8H 8F 8B
3H 3F 3B
7H 7F 7B
2H 2F 2B
6H 6F 6B
1H 1F 1B
5H 5F 5B
3
− +
2H 2N 2R
1H 1N 1R
4
G1 G2
L1 L2
6H 6F 6B
5H
5F 5B
4B 4H 4F
3H 3F
3F1
2B1 2H
2B
1H 1F
1H1 1B1
5
G3 C2
G1 G4
L1 L3 L2 L4
9H 9N 9R
8DN
8DR
7N
7H
7H1
7R1
6H 6DR
5H 5N
4H 4DN
3N 3H 3H1
3N1
2N 2H 2H1 2R
1N 1H 1R
6
G1 G2 G3 G4
L1 L2
L3 L4
4H 4F 4B
8H 8F 8B
3H 3F 3B
7H 7F 7B
2H 2F 2B
6H 6F 6B
1H 1F 1B
5H 5F 5B
NEUTRAL POLARIZED
INTERLOCKING FLASHER
FLASHER
2-POSITION
3-POSITION
INTERLOCKING FLASHER
D. C. RELAYS
A. C. RELAYS

NOTES:

H = Heel.
F = Front Contact.
B = Back "
N = Normal "
R = Reverse "

P = Polar Contact.
C = A.C. Control.
L = A.C. Local.
D = Contact closed when relay is de-energized.

+ = Normally positive, right-hand coil terminal.
− = Normally negative, left-hand coil terminal.

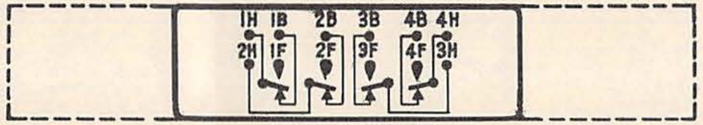
The number "I" used after H, F, B, N and R designates an additional independent contact in contact tier.

Numbering of contacts on all relays are from left to right.

Contact group of each relay shall be numbered consecutively from left to right when viewed from the front.

The contact groups shown represent contact arrangements used in various relays.

The "N" contacts of polarized relays are closed when energy is applied as shown in diagram I.


1H 1B 2B 3B 4B 4H
2H 1F 2F 3F 4F 3H

NEUTRAL

RELAY CONTACT POST DESIGNATION PLATE—ETCHED

(a) Minimum size for letters and figures of contact post designations to be 1/16 inch.

(b) Plate to be permanently attached to front of relay to allow clear vision of contact post designations and relay contacts.

(c) Plate may be of such dimensions as to include also serial number, manufacturers references, and other information.

(d) Plate shall have posts shown in same relative position as actual posts on relay.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

RELAY CONTACT POST DESIGNATIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R.

435

ISSUE	DATE
1	12-17-1930
2	4-20-1937

Approved by Representatives of Lines Shown.

J C Mock
Chairman

BONDING

1 Bonds, except concealed propulsion bonds, must be inspected monthly. Defective bonds must be immediately replaced.

2 Direct current track circuits through road crossings, station platforms or other places where visual inspection of bonding cannot readily be made, must be tested frequently to determine that bonds are not broken or defective, by connecting ammeter in series with track battery and observing the movement of needle which should show either a gradually increased reading as train approaches battery end or gradually decreased reading if train is moving away from battery end. Any sudden movement of needle indicates that train has just passed over joints with defective bonding. (Rail joint bonding in electric propulsion circuit is tested by Transmission Department).

3 Bonding through road crossings, station platforms and other places where visual inspection cannot readily be made, must be renewed whenever planking or paving is removed. If planking or paving has not been removed for a long period and in Maintainer's judgment bonding is in need of renewal, the Maintainer must request Section Foreman to remove planking or paving.

4 Foreign current tests may be made by disconnecting battery and placing ammeter in series with track relay. If track circuits are found with foreign current, report should be made to the Signal Supervisor. In territory where foreign current is found in track circuit particular care should be taken to prevent bond wire and insulated joint failures.

RAIL CONNECTIONS

5 Rail connections must be inspected frequently. They must be kept tight and properly formed and when possible below top of ties.

6 Test of shunt and fouling section connections must be made at least once each 3 months. Effectiveness of switch circuit controller shunt must be determined by operating only the shunting contacts. Each contact must be tested separately.

7 Effectiveness of fouling section connections must be determined by shunting track circuit with a standard .060 ohm resistance at end of fouling section farthest from point of connection with main circuit and noting that shunt is effective.

BALLAST

8 Ballast must be kept at least 1 inch clear of rail, fastenings and anchors. When ballast is not clear of rail, Maintainer must request Section Foreman to clear. If Maintainer cannot secure action from Section Foreman he must take up with Signal Supervisor.

Maintenance of Way Department Rule reads:

> "Where rails are bonded, any ballast, mud or dirt that may touch the rails should be removed to allow a clear space of at least 1 inch below the base of rail. At road crossings, platforms, etc., where it is not possible to keep the rails clear, the mud or dirt shall be removed and clean ballast substituted."

INSULATED JOINTS

9 Insulated joints must be inspected monthly to insure that fibre plates and bushings are in proper condition. Maintainer must notify Section Foreman if insulated joints are in need of renewal. If Maintainer cannot secure action from Section Foreman he must take up with Signal Supervisor.

NOTE: See Maintenance of Way Department Instructions for applying insulated joints.

10 To test insulated joints between adjacent track circuits or from track circuit to dead section, connect voltmeter between rails at relay end of track circuit and then connect shunt wire from north rail of one circuit to south rail of adjacent circuit or track and vice versa. If the voltmeter shows marked decrease in voltage when shunt wire is applied the insulated joint should be taken off and examined for defects.

11 Double end insulated joints may be tested with ohmmeter when such equipment is available.

BATTERIES, TRANSFORMERS AND RECTIFIERS

12 Batteries, transformers and rectifiers must be inspected frequently and maintained in accordance with current instructions.

13 Track feeds must have a current limiting device between feed and track and it must be adjusted to secure proper current through track relay. In no case shall the limiting device be less than that value which will allow track relay to release when track circuit is shunted at rails at either feed or relay end with a .060 ohm shunt.

RELAYS

14 Relays must be visually inspected frequently for defects, and must be maintained in accordance with current instructions.

15 For direct current circuits; once each year and more frequently, when conditions require, a check of the current through the relays must be made when ties and ballast are wet, to determine that sufficient current is flowing to insure proper operation, and when ties and ballast are dry that current flow does not exceed .250 amp. Track shunt tests must be made at least once each 6 months to insure that track relays will drop away when a .060 ohm resistance shunt is applied across the rails when track and ballast is dry or frozen.

16 For alternating current circuits; track circuits must be maintained so that relays will drop away when shunts as listed below are applied across the rails. These tests must be made frequently when ties and ballast are dry. When circuit adjustment is changed or relay replaced, shunt test must be made. Resistance of shunts for the various relays and circuits are as follows:

RELAY TYPE	SINGLE OR DOUBLE RAIL	RESISTANCE OF SHUNT
K-2	Single	.5
N	Single	.5
N	Double	.2
D	Double	.1
OTHER	Single	.1
OTHER	Double	.060

GENERAL

17 If any apparatus is found to not meet the requirements, the condition must be reported to the Signal Supervisor as soon as possible and the situation must be protected as required by the rules and instructions in effect.

RAIL RENEWALS AND CHANGES

18 When rail renewals and changes are to be made, the track wires must be disconnected from the track relays affected before the rails are disconnected and such track wires must not be connected until rails are again connected. After rails are connected the wires may be connected to permit train movement, but after entrance of each train into section the track wires must be again disconnected from the rails affected and remain disconnected while train is occupying the track section where rail renewals or changes were made, until such time as proper shunting is obtained.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
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P.&L.E.R.R.
RUTL.R.R.

440

1 8-15-1939
2 1-15-1940

TRACK CIRCUITS

INSTRUCTIONS

Approved by Representatives of Lines shown.
Chairman

After N.Y.C. C-5

Plan rev'd and re-
numbered 464 Issue: 1
10-15-41 - A.A.R. Table -
Part 203 substituted,
cancels old plan 443
Issue: 2 of 7-20-1934

TABLE OF SIGNAL AND INTERLOCKING UNITS

1940

Official Approval
Nov. 1922, July 1924, July 1929, July 1930, Sept. 1934, Dec. 1935,
Aug. 1938, March 1941.

Unit No.	Description	Relative Unit Value
1	Signal arm, or light, inoperative	1
2	Signal, complete with mast, blade, or light, inoperative	2
3(a)*	Signal, two indication, semaphore or light	4
(b)*	Signal, each additional indication	2
(c)*	Signal, mechanically operated, manual block, train order, or railroad grade crossing signal, two or three indication	4
4*	Marker light, operated	2
5*	Grade signal, semaphore or light, operative	2
6	Switch (2 points) or derail	
	(a) Mechanical	4
	(b) Power	8
7	Slip switch (2 points)	
	(a) Mechanical	4
	(b) Power	8
8	Slip switch (4 points)	
	(a) Mechanical	8
	(b) Power	12
9	Movable point frog (4 points)	
	(a) Mechanical	8
	(b) Power	12
10	Derail, pipe connected to switch and operated thereby	1
11	Detector bar, 55 ft. in length, or fraction thereof	2
12(a)	Facing point lock, drawbridge lock or drawbridge rail lock	
	(aa) Mechanical	2
	(ab) Power	6
(b)	Facing point lock, drawbridge lock or drawbridge rail lock operated with another unit	1
(c)	Mechanical facing point lock on spring switch	4
13	Switch-and-lock movement, mechanical	1
14(a)	Drawbridge circuit controller or pipe coupler	
	(aa) Mechanical	4
	(ab) Power	8
(b)	Drawbridge circuit controller or pipe coupler operated with another unit	2
15(a)	Non-coded track circuit	2
(b)	Superimposed track circuit, coded	2
(c)	Coded track circuit	4
(d)	Track instrument per direction	2
16(a)	Electric lever lock applied to a mechanical lever	1
(b)	Electric lock on hand operated switch or railroad grade crossing gate	2
(c)	Electric lock applied to units 12-a, 12-b and 13	1
17	Skate placing machine	4
18	Car retarder including operating mechanism per rail foot of brake shoe length	1
19(a)	Highway grade crossing signal, bell type, with or without reflectorized signs, per mast	1
(b)	Highway grade crossing signal, wig-wag or flashing light type (one pair of flashing lights), with or without bell or reflectorized signs, per mast	2
(c)	Additional two flashing lights or illuminated stop sign	1
(d)	Additional gate mechanism	2
20	Highway grade crossing gate, per post	
	(a) Mechanical	1
	(b) Power	2
21(a)	Train control inductor or loop circuit	1
(b)	Train control ramp (energized) magnet	2
22(a)	Switch, automatic block signal protection	1
(b)	Additional switch circuit controller operated from a switch lock lever	1
(c)	Spring switch buffer	1
23	Switch indicator	2
24	Gates (railroad grade crossing, per gate)	
	(a) Mechanical	2
	(b) Power	4
25(a)	Switch or derail, target or light	1
(b)	Track pan lights per mast	1
26	Third rail clearance indicator, per instrument	2
27	Approach locking per track per direction	2
28(a)	Traffic lever (including circuit within the signal station)	1
(b)	Traffic lever (including circuit within and without the signal station)	2

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* Each semaphore arm, light signal or marker to be counted separately and not in combination.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

464
10-15-1941

UNITS

SIGNAL AND INTERLOCKING TABLE
(A.A.R. SIG. SEC.— PART 203)

Approved by Representatives of Lines shown.

Chairman

Plan rev'd and re-
numbered 464 Issue: 1
10-15-41 - A.A.R. Table -
Part 203 substituted;
cancels old plan 443
Issue: 2 of 7-20-1934

TABLE OF SIGNAL AND INTERLOCKING UNITS

1943

Official Approval

Nov. 1922, July 1924, July 1929, July 1930, Sept. 1934, Dec. 1935, Aug. 1938, Mar. 1941, Mar. 1944.

Unit No.	Description	Relative Unit Value
1	Signal arm, or light, inoperative	1
2	Signal, complete with mast, blade or light, inoperative	2
3(a)	*Signal, two indication, semaphore or light	4
(b)	*Signal, each additional indication	2
(c)	*Signal, mechanically operated, manual block, train order or railroad grade crossing signal, two or three indication	4
4*	Marker light, operated	2
5*	Grade signal, semaphore or light, operative	2
6	Switch (2 points) or derail	
	(a) Mechanical	4
	(b) Power	8
7	Slip switch (2 points)	
	(a) Mechanical	4
	(b) Power	8
8	Slip switch (4 points)	
	(a) Mechanical	8
	(b) Power	12
9	Movable point frog (4 points)	
	(a) Mechanical	8
	(b) Power	12
10	Derail, pipe connected to switch and operated thereby	1
11	Detector bar, 55 ft. in length, or fraction thereof	2
12(a)	Facing point lock, drawbridge lock or drawbridge rail lock	
	1. Mechanical	2
	2. Power	6
(b)	Facing point lock, drawbridge lock or drawbridge rail lock operated with another unit	1
(c)	Mechanical facing point lock on spring switch	4
13	Switch-and-lock movement, mechanical	1
14(a)	Drawbridge circuit controller or pipe coupler	
	1. Mechanical	4
	2. Power	8
(b)	Drawbridge circuit controller or pipe coupler operated with another unit	2
15(a)	Non-coded track circuit	2
(b)	Superimposed track circuit, coded	2
(c)	Coded track circuit	4
(d)	Track instrument per direction	2
16(a)	Electric lever lock applied to a mechanical lever	1
(b)	Electric lock on hand-operated switch or railroad grade crossing gate	2
(c)	Electric lock applied to units 12-a, 12-b and 13	1
17	Skate placing machine	4
18	Car retarder including operating mechanism per rail foot of brake shoe length	1
19(a)	Highway grade crossing signal, bell type, with or without reflectorized signs, per mast	1
(b)	Highway grade crossing signal, wig-wag or flashing light type (one pair of flashing lights), with or without bell or reflectorized signs, per mast	2
(c)	Additional two flashing lights or illuminated stop sign	1
(d)	Each gate mechanism	4
20	Highway grade crossing gate, per post	
	(a) Mechanical	1
	(b) Power	2
21(a)	Train control inductor or loop circuit	1
(b)	Train control ramp (energized) magnet	2
22(a)	Switch, automatic block signal protection	1
(b)	Additional switch circuit controller operated from a switch lock lever	1
(c)	Spring switch buffer	1
23	Switch indicator	2
24	Gates (railroad grade crossing, per gate)	
	(a) Mechanical	2
	(b) Power	4
25(a)	Switch or derail, target or light	1
(b)	Track pan lights per mast	1
26	Third rail clearance indicator, per instrument	2
27	Approach locking per track per direction	2
28(a)	Traffic lever (including circuit within the signal station)	1
(b)	Traffic lever (including circuit within and without the signal station)	2

---

* Each semaphore arm, light signal or marker to be counted separately and not in combination.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& St.L.RY.
B.&A.R.R.
P.&L.E.R.R.

464B

10-15-1941
5-22-1945

UNITS

SIGNAL AND INTERLOCKING TABLE

(A.A.R. SIG. SEC.— PART 203)

Approved by Representatives of Lines shown.

Chairman

GENERAL

Conductors of proper gage for 110 to 550 volt signal power circuits may be included in cables under Sections 1, 2, 3, and 4.

To meet special conditions the following references and instructions may be modified when authorized by Signal Engineer.

1 UNDERGROUND RUNS WITHOUT DUCTS

(a) SINGLE AND MULTIPLE CONDUCTOR, INSULATED, NON-METALLIC SHEATHED CABLE:

(1) SINGLE CONDUCTOR CABLES:

Ordering Reference: A.A.R. Signal Section Spec. 161-50, Manual Part 36; Insulation thickness "A", Table 1 plus outer covering in accord with R-7-c-1-2. R-7-c-3 shall not apply. Par. 9: Moisture seal sheath shall have a minimum thickness of 4/64" and shall not adhere to the sheath of the conductors.

Inductor cables:

. . . Ft. #8 AWG 19 strand
Track Connections:
. . . Ft. #6 AWG 19 strand
. . . Ft. #4 AWG solid
. . . Ft. #6 AWG solid
. . . Ft. #8 AWG solid
. . . Ft. #9 AWG solid
. . . Ft. #10 AWG solid

(2) MULTIPLE CONDUCTOR CABLES:

Ordering Reference: A.A.R. Signal Section Spec. 161-50, Manual Part 36; Insulation thickness "A", Table 1 plus outer covering in accord with R-7-c-1-2. R-7-c-3 shall not apply. Par. 9: Moisture seal sheath shall not adhere to the sheath of the conductors.

. . . Ft. cable consisting of:
. . . Conductors #4 AWG 19 strand
. . . " #6 AWG 19 strand
. . . " #8 AWG 19 strand
. . . " #8 AWG solid
. . . " #10 AWG solid
. . . " #12 AWG solid
. . . " #14 AWG solid

(b) SINGLE AND MULTIPLE CONDUCTOR, INSULATED, LEAD COVERED PARKWAY CABLE, ARMORED WITH ZINC TAPE:

Ordering Reference: A.A.R. Signal Section Spec. 145-50, Manual Part 20; Insulation thickness "A", Table 1, plus outer covering in accord with R-7-c-1-2. R-7-c-3 shall not apply.

Armoring in accord with R-11-b-1.

For conductor schedule see Par. 1(a) (1) and 1(a) (2).

2 UNDERGROUND RUNS WITH DUCTS

(a) SINGLE AND MULTIPLE CONDUCTOR, INSULATED, LEAD SHEATHED CABLE:

Ordering Reference: A.A.R. Signal Section Spec. 91-50, Manual Part 28; Insulation thickness "A", Table 1, plus outer covering in accord with R-7-c-1-2. R-7-c-3 shall not apply.

For conductor schedule see Par. 1(a) (1) and 1(a) (2).

3 SUBMARINE CABLE

(a) MULTIPLE CONDUCTOR, INSULATED, SUBMARINE CABLE, LEAD SHEATHED AND ROUND STEEL ARMORED:

Ordering Reference: A.A.R. Signal Section Spec. 90-50, Manual Part 26; Insulation thickness "A", Table 1, plus outer covering in accord with R-7-c-1-2. R-7-c-3 shall not apply.

For conductor schedule see Par. 1(a) (2).

4 AERIAL CABLE

(a) SINGLE AND MULTIPLE CONDUCTOR, INSULATED, POLYCHLOROPRENE SHEATHED CABLE:

Ordering Reference: A.A.R. Signal Section Spec. 240-50, Manual Part 249; Insulation thickness "A", Table 1, plus outer covering in accord with R-7-d-1-2. R-7-d-3 shall not apply. Par. 9: Moisture seal sheath shall not adhere to the sheath of the conductors.

For conductor schedule see Par. 1(a) (1) and 1(a) (2).

5 MISCELLANEOUS OUTSIDE WIRING AND POLE LINE DROPS

(a) SINGLE CONDUCTOR INSULATED WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 111-50, Manual Part 186; Insulation thickness "A", Table 1. Outer covering shall be in accord with Alternate Requisite R-8-a-2.

. . . Ft. #4 AWG 19 strand
(500 to 1000 ft. per coil)
. . . Ft. #6 AWG 19 strand
(1000 to 1350 ft. per coil)
. . . Ft. #6 AWG solid
. . . Ft. #8 AWG solid
. . . Ft. #8 AWG 19 strand
. . . Ft. #10 AWG solid
. . . Ft. #10 AWG 19 strand
. . . Ft. #12 AWG solid
. . . Ft. #12 AWG 19 strand
. . . Ft. #14 AWG solid
. . . Ft. #14 AWG 19 strand
(1500 to 2000 ft. per coil)

6 INSIDE WIRING, BUILDING, BOXES, ETC., WHERE NOT EXPOSED TO WEATHER

(a) SINGLE CONDUCTOR INSULATED WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 111-50, Manual Part 186; Insulation thickness "B", Table 1. Outer covering shall be in accord with Alternate Requisite R-8-a-2.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

WIRES AND CABLES
ORDERING REFERENCES
AND INSTRUCTIONS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

485F
2-8-1952

Approved by Representatives of lines shown.
Corcoran
Chairman.

(CONT. ON PAGE 2)

RECEIVED
JUN 16 1952
SPECIFICATION DEPT.

. . . Ft. #12 AWG 19 strand
. . . Ft. #12 AWG solid
. . . Ft. #14 AWG solid
. . . Ft. #14 AWG 19 strand
. . . Ft. #16 AWG 19 strand
(1000 to 1500 ft. per coil)

7A PLUG-IN TYPE RELAY RACKS, CODE UNITS

(a) SINGLE CONDUCTOR INSULATED WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 111-50, Manual Part 186; except insulation shall withstand the application of 3000 volts for one minute, (test to be made in accordance with A.S.T.M. Spec. D-27). Outer covering shall be in accord with Alternate Requisite R-8-a-2.

. . . Ft. #10 AWG 37 strand 2/64" insulation
. . . Ft. #16 AWG 19 strand 2/64" insulation
. . . Ft. #18 AWG 19 strand 2/64" insulation
(1000 to 1500 ft. per coil)

7B MISCELLANEOUS COIL LEADS, SIGNAL SHOP

(a) SINGLE CONDUCTOR INSULATED WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 111-50, Manual Part 186; except insulation shall withstand 3000 volts for one minute, (test to be made in accordance with A.S.T.M. Spec. D-27). Outer covering shall be in accord with Alternate Requisite R-8-a-2.

. . . Ft. #18 AWG 19 strand 1/64" insulation
. . . Ft. #20 AWG 19 strand 1/64" insulation
(1000 to 1500 ft. per coil)

8 LINE WIRE WITH WEATHER-RESISTANT DOUBLE BRAID COVERING

(a) 30% COPPER-COVERED STEEL WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 167-48, Manual Part 180.

. . . Ft. #10 AWG (23.2 ft. per lb.)
. . . Ft. #6 AWG (10.7 ft. per lb.)
. . . Ft. #8 AWG (19.4 ft. per lb.)

(b) HARD DRAWN COPPER WIRE:

Ordering Reference: A.A.R. Signal Section Spec. 169-48, Manual Part 182.

. . . Ft. #2 AWG (4.1 ft. per lb.)
. . . Ft. #4 AWG (6.6 ft. per lb.)
. . . Ft. #6 AWG (10 ft. per lb.)
. . . Ft. #8 AWG (15.2 ft. per lb.)
. . . Ft. #10 AWG (21.7 ft. per lb.)

WIRING

21 Wires must be identified at terminals. Wire nomenclature must be in accordance with current circuit plans.

22 Tags must be in such position that they cannot interfere with operation of moving parts.

23 Wires must be inspected for deterioration of insulation.

24 Wire must be handled to avoid sharp bends, kinks and abrasion of insulation.

25 Wire must not be nicked when insulation is being removed.

26 Portions of insulated wire which have been nicked or severely kinked must not be used.

27 Wires must be neatly arranged in proper place. Wire must not be stepped upon, crushed or forcibly crowded into place.

28 Insulation must not be cut or punctured for testing.

29 Lacing twine must not be used in forming wire runs of individual conductors. Scotch electrical tape or friction tape not smaller than ¼" width shall be used for this purpose. When friction tape is used, it must be coated with insulating paint.

30 Ends of wires not in use in housings, on relay racks or other locations where circuits are in service, must be taped.

31 Joints and repairs to damaged insulation must be made in accordance with current instructions. Joints must not be made between cables in underground runs except in housings provided for that purpose.

32 Oil, gasoline, and other injurious substances must be kept away from insulation.

33 Loose nuts, washers, wire cuttings or other materials must not be left in relay and other housings.

INSIDE WIRING, BUILDINGS, BOXES, ETC., WHERE NOT EXPOSED TO WEATHER

34 Unless otherwise specified, No. 12 wire shall be used for wiring between entrance terminals and interlocking machine terminals for switch and derail control circuits where current requirement is less than 10 amperes.

35 Unless otherwise specified, No. 14 wire shall be used for wiring between entrance terminals or lightning arresters and all other apparatus in relay housings and signal stations where current requirement is less than 10 amperes.

36 Where clearance requires, No. 16 wire specified in Para. 7A may be used for wiring electric lever locks, interlocking machines, relay housings, etc.

BINDING POSTS

37 Washer must be placed over each wire on binding post.

38 Solid wire eyes and eyelets must be approximately 25 per cent greater in diameter than binding post. Solid wire must be placed around binding post clockwise without twisting the wire.

39 Connecting link between terminal binding posts must be placed between binding nuts. All nuts must be kept tight.

WIRE PROTECTION

40 Wire must be protected in accordance with standard practice.

41 Wire opening must be large enough to admit wire without forcing.

(CONT. ON PAGE 3)

SIGNAL LINES

42 Clearance must be in accordance with standard instructions.

43 Line wires, cables, connections and supports must be installed and maintained in accordance with standard practice.

44 Line wire must be properly secured to insulators.

45 Line or cable drops must be neatly arranged and properly supported.

46 Insulators and pins must be in place and in good condition.

47 When stringing wire, slack must not be permitted over highway, railroad crossings, or power lines.

48 Guy wires must be free from contact with line wires and kept tight.

49 Sleeve connections must be made without injuring wire.

50 Portions of line wire which have been nicked or kinked must not be used.

51 Special care must be exercised to see that line wires do not come in contact with other wires, roofs, trees, chimneys, signal blades, etc.

UNDERGROUND CABLE WITHOUT DUCTS

52 To protect underground cable against damage from termites or soil organisms, cables should not be installed adjacent to untreated underground wood.

Where such installations cannot be avoided, adequate cable protection must be provided.

53 Cable installed outside of tracks must be buried not less than 24 in. below top of ground.

54 Cable installed under and between tracks must be buried not less than 24 in. below bottom of ties.

55 Where cable cannot be buried the standard depth due to local conditions special protection must be provided.

56 Sand or loam free of sharp material injurious to the cable must be placed around the cable to a minimum depth of 3 inches.

57 The Signal employe in charge must confer with track Supervisor or Track Foreman in regard to proposed location of cables and protection of tracks.

58 Material removed from trenches must not be mixed with ballast and the replacement of such material must be in accordance with Track Department requirements.

59 Trenches must be protected and where ties have been undermined, the Track Department must be notified.

60 Cables brought out of ground must be protected at the ground line by soil pipe or equal.

61 Cables must be brought out of ground through risers for connections to track, switch machines, switch circuit controllers, inductors, etc.

62 Inside diameter of soil pipe or riser shall provide ample clearance for cables. Bottom of soil pipe or riser must not rest on cable.

63 Cable must not be installed less than 6 in. from, or closely parallel to metal conduit carrying electric propulsion cable.

64 In electric propulsion territory where cables with metallic covering enter buildings, the metallic covering must be removed for a sufficient distance and in a manner to prevent foreign current from entering the building on the cable covering.

TERMINATING CABLE CONDUCTORS

65 The terminal ends of cables must be protected against moisture and properly housed in terminal box, relay housing or building. Remove only a sufficient amount or length of outer covering to permit the proper forming and terminating of the conductors.

66 The ends of lead cable sheath must be expanded using a wooden wedge as a tool, and the ends of all cables sealed against moisture, using sealing compound. Compound must surround each conductor and extend ¼" beyond end of sheath.

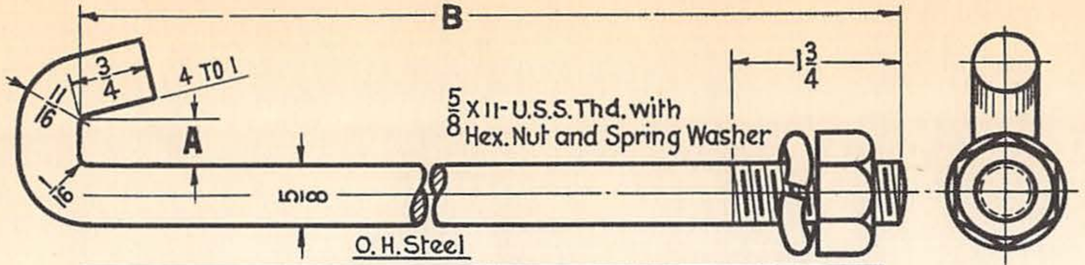
67 Friction tape using half-lap, shall be applied over end of sheath and along formed conductors for a sufficient distance to hold the compound in place. Two coats of insulating paint shall be applied, the second coat not to be applied until after the first dries.

68 Cable paint shall be in accordance with Instruction 350, and sealing compound shall be in accordance with Instruction 405.

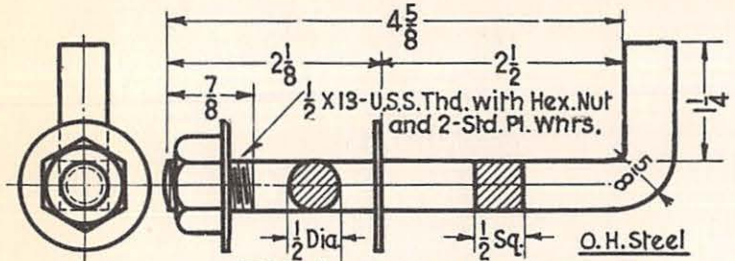
69 Cable markers placed flush with the surface of the ground may be used to show the location of underground cables.

INSULATION TEST

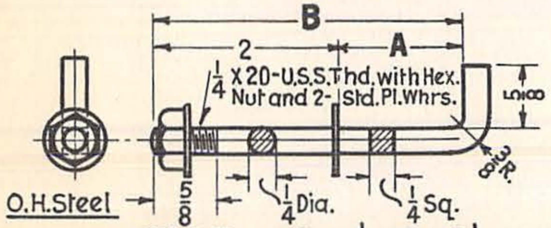
70 Tests of wires and cables must be made as required by current instructions.


B
$\frac{3}{4}$
4 TO 1
$\frac{11}{16}$
A
$\frac{1}{16}$
$\frac{5}{8}$
$1\frac{3}{4}$
$\frac{5}{8}$ X 11-U.S.S. Thd. with Hex. Nut and Spring Washer
O. H. Steel

ORDER NO.	A	B	For Split Point Derail Rod Guide Clip 2302-1
700-1	$\frac{11}{32}$	$7\frac{1}{4}$	For use with 105 lb. Dudley and 100 lb. A.S.C.E. Rail.
700-2	$\frac{7}{16}$	$7\frac{1}{2}$	" " " 115 lb. " Rail.
700-3	$\frac{7}{16}$	$8\frac{1}{2}$	" " " 127 lb. " "


$4\frac{5}{8}$
$2\frac{1}{8}$
$2\frac{1}{2}$
$\frac{7}{8}$
$\frac{1}{2}$ X 13-U.S.S. Thd. with Hex. Nut and 2-Std. Pl. Whrs.
$1\frac{1}{4}$
$\frac{5}{8}$
$\frac{1}{2}$ Dia.
$\frac{1}{2}$ Sq.
O. H. Steel

700-4 (For Tool Board 2000-13)


B
2
A
$\frac{1}{4}$ X 20-U.S.S. Thd. with Hex. Nut and 2-Std. Pl. Whrs.
$\frac{5}{8}$
$\frac{3}{8}$ R.
O.H. Steel
$\frac{5}{8}$
$\frac{1}{4}$ Dia.
$\frac{1}{4}$ Sq.

700-5 — A = $1\frac{1}{4}$, B = $3\frac{1}{4}$
(For Tool Board 2000-13)
700-6 — A = $3\frac{3}{4}$, B = $5\frac{3}{4}$
(For Switch Blocks, where mounted on Tool Boards)

NOTES:
Scale: 6 ins. = 1 ft. — All dimensions given in inches.
When ordering give reference number shown in large type.

SIGNAL AND TRAIN CONTROL COMMITTEE

HOOK BOLTS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(O.C.L.).
M.C.R.R.
C.C.C.&St.L.Ry.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

700

ISSUE	DATE
1	3-28-1906
2	1-28-1932

Approved by Representatives of Lines shown.
J.C. Mock
Chairman

WAH

DEPT. 41
MAY
2
1932

ORDERING REFERENCE							SPECIFICATION AND INITIAL RATING TEST DATA														
Item No.	Volts	Amps.	Watts	Candle power	Bulb	Base	Filament	Light center length	Precision	Pins	Design volts	Rated average lab. life (hours)	L.P.W. or W.P.S.C.P.	TOLERANCES (% + OR −)		LIMITS		SEASONING AND TEST DATA			Item No.
														L.P.W. or W.P.S.C.P.	Watts or S.C.P.	L.P.W. or W.P.S.C.P.	Watts or S.C.P.	%Volts	Minutes	Standard comparison lamp	
1	3.5	.3			S-11	SC	C-2R	1¼	1/16	⊕	3.3	1000	7.7								1
1A	3.5	.12			S-11	SC	C-2R	1¼	1/16	⊕	3.5	1000	6.5								1A
3	6	.12-.16			T-2	SLIDE	C-2VS		*		6										3
4	6-8			15	S-8	SC	C-2R or C-6	1⅛		⊖	6.65	500						100	45	15CP — 6-8V — S-8	4
5	6-8			21	S-8	SC	C-2V	1¼	A	⊕	6.5	125	△ .76	△ 5	□ 7	△ .72 — .80	□ 19.6 — 22.5	100	45	21CP — 6-8V — S-8	5
6	6-8			3	G-6	CAN.	C-2R	15/16			6.85	500	△ 1.34	△ 6	□ 8	△ 1.26 — 1.43	□ 2.77 — 3.24	100	45	3CP — 6-8V — G-6	6
7	8		18		A-15	3PS	C-2R	2 3/16	1/64		8	1500	12.	12	7	10.56 — 13.44	16.74 — 19.26	120	60	25W — 32V — A-19	7
7A	8		18		A 15	2PS	C-2 (R or V)	2 7/32	1/64		8	1500	12.	12	7	10.56 — 13.44	16.74 — 19.26	120	60	25W — 32V — A-19	7A
8	10	.25			S-11	SC	C-2R	1¼	1/16	⊕	10	1000	9.	12	10						8
9	10		5		S-11	SC	C-2R	1¼	1/64	⊕	10	1000	10.4	12	7	9.15 — 11.65	4.65 — 5.35	115	60	3CP — 6-8V — G-6	9
11	10		10		S-11	SC	C-2R	1¼	1/32	⊕	10	1000	12.3	10	7	11.07 — 13.53	9.3 — 10.7	115	60	25W — 32V — A-19	11
12	10		18		A-15	3PS	C-2R	2 3/16	1/64		10	1500	12.2	12	7	10.74 — 13.66	16.74 — 19.26	120	60	25W — 32V — A-19	12
13	10		18		A-15	2PS	C-2 (R or V)	2 7/32	1/64		10	1500	11.5	10	7	10.35 — 12.65	16.74 — 19.26	120	60	25W — 32V — A-19	13
14	10		18		S-11	SC	C-2R	1¼	1/32	⊕	10	1000	14.2	10	7	12.49 — 15.90	16.74 — 19.26	115	60	25W — 32V — A-19	14
15	10		40		A-15	3PS	C-2V	2 3/16	1/64		10	1500	13.7	10	7	12.33 — 15.07	37.2 — 42.8	120	60	60W — 115V — A-21	15
15A	10		40		A-15	2PS	C-2V	2 7/32	1/64		10	1500	13.7	10	7	12.33 — 15.07	37.2 — 42.8	120	60	60W — 115V — A-21	15A
16	12	.12			S-11	SC	C-2VS	1¼	1/16	⊕	12	1000	8.								16
17	12	.3			S-11	SC	C-2VS	1¼	1/32	⊕	12	1000	△ 2.4	10	12	2.16 — 2.64	3.17 — 4.03	100	45		17
19	12		9		G-16½	2PS	C-2R	1.91	1/64		12	1500	10.8	12	7	9.5 — 12.1	8.48 — 9.76	120	60	9W — 12V — G-16½	19
20	12-16			21	S-8	SC	C-2R	1¼	A	⊕	12.8	300	△ .81	△ 9	□ 10	.74 — .89	□ 19. — 23.2	105	45	21CP — 6-8V — S-8	20
21	12-16			21	S-8	DC	C-2R	1¼	A	⊕	12.8	300	△ .81	△ 9	□ 10	.74 — .89	□ 19. — 23.2	105	45	21CP — 6-8V — S-8	21
22	12	.17			T-2	SLIDE	C-21		*		12										22
23	12-16			3	G-6	SC	C-2R	¾	*	⊕	13	1000	△ 1.56	△ 12	□ 15	1.39 — 1.75	2.6 — 3.46	115	30		23
24	12-16			3	G-6	DC	C-2R	¾	*	⊕	13	1000	△ 1.56	△ 12	□ 15	1.39 — 1.75	2.6 — 3.46	115	30		24
25	12-16			3	G-6	MS	C-2R	⅞			13	1000						115	30		25
26	14		5		S-14	MED.	S-1	2½			14	1500	7.7								26
26A	14	.2			G-6	SC	C-2VS	¾			14	1000	6.8								26A
27	20	.06-.085			T-2	SLIDE	C-21		*		20										27
28	60		5		S-14	MED.	C-9	2½			60	1500	7.9								28
29	60		20		S-14	MED.	CARBON		**		60										29
30	64		6		S-6	SC	C-7A	1 1/16			64	1500	7.5								30
31	75			2	S-8	MS	CARBON		**		75										31
32	125		10		S-11	SC	C-7A	1¼			125	1500	8.2								32

EXPLANATIONS:

2PS=2 Pin rebasing sleeve (US&S Co.).
3PS=3 " " " (GRS Co.).
SC=Single contact bayonet candelabra base.
DC=Double " " " "
CAN.=Candelabra screw base.
MS=Miniature screw base.
MED.=Medium " "

□=Spherical candle power.
SLIDE=Telephone switchboard type base.
S–As in C-2VS=Supported filament.
A–Under precision.=Axial alignment 0.03 in. and light center length 0.04 in.
R=Rounded filament.—V="V" Shaped filament.
⊖=Plane of base pins parallel to plane of filament.
⊕= " " " " at 90 deg. angle to plane of filament.
△=Watts per spherical candle power.

NOTES: Lamps to be furnished in accordance with N.Y.C. System Specifications: *=No. 3015A—**=No. 3015.

Values shown in column headed "Precision" indicate maximum permissible variation of filament from correct location. R.P. 11 Bulbs may be substituted for S-11 and A-15.

Plan rev'd 12-13-1938 and renumbered 750 was old No. 88 Issue: 1 of 2-27-35. Redrawn on large sh. 5-29-39.

SIGNAL AND TRAIN CONTROL COMMITTEE | **750**

NEW YORK CENTRAL SYSTEM

SIGNAL ELECTRIC LAMPS

1 8-26-1939
2 12-14-1940

(CONT'D ON PAGE....)

ORDERING REFERENCE							SPECIFICATION AND INITIAL RATING TEST DATA														
														TOLERANCES (% + OR −)		LIMITS		SEASONING AND TEST DATA			
Item No.	Volts	Amps.	Watts	Candle power	Bulb	Base	Filament	Light center length	Precision	Pins	Design volts	Rated average lab. life (hours)	L.P.W. or W.P.S.C.P.	L.P.W. or W.P.S.C.P.	Watts or S.C.P.	L.P.W. or W.P.S.C.P.	Watts or S.C.P.	%Volts	Minutes	Standard comparison lamp	Item No.
1	3.5	.3			S-11	SC	C-2R	1¼	1/16	⊕	3.3	1000	7.7								1
1A	3.5	.12			S-11	SC	C-2R	1¼	1/16	⊕	3.5	1000	6.5								1A
3	6	.12-.16			T-2	SLIDE	C-2VS		*		6										3
4	6-8			15	S-8	SC	C-2R or C-6	1⅛		⊖	6.65	500						100	45	15CP — 6-8V — S-8	4
5	6-8			21	S-8	SC	C-2V	1¼	A	⊕	6.5	125	△ .76	△ 5	□ 7	△ .72 — .80	□ 19.6 — 22.5	100	45	21CP — 6-8V — S-8	5
6	6-8			3	G-6	CAN.	C-2R	15/16			6.85	500	△ 1.34	△ 6	□ 8	△ 1.26 — 1.43	□ 2.77 — 3.24	100	45	3CP — 6-8V — G-6	6
7	8		18		A-15	3PS	C-2R	2 3/16	1/64		8	1500	12.	12	7	10.56 — 13.44	16.74 — 19.26	120	60	25W — 32V — A-19	7
7A	8		18		A 15	2PS	C-2V	2 7/32	1/64		8	1500	12.	12	7	10.56 — 13.44	16.74 — 19.26	120	60	25W — 32V — A-19	7A
8	10	.25			S-11	SC	C-2R	1¼	1/16	⊕	10	1000	9.	12	10						8
9	10		5		S-11	SC	C-2R	1¼	1/64	⊕	10	1000	10.4	12	7	9.15 — 11.65	4.65 — 5.35	115	60	3CP — 6-8V — G-6	9
11	10		10		S-11	SC	C-2R	1¼	1/32	⊕	10	1000	12.3	10	7	11.07 — 13.53	9.3 — 10.7	115	60	25W — 32V — A-19	11
12	10		18		A-15	3PS	C-2R	2 3/16	1/64		10	1500	12.2	12	7	10.74 — 13.66	16.74 — 19.26	120	60	25W — 32V — A-19	12
13	10		18		A-15	2PS	C-2V	2 7/32	1/64		10	1500	11.5	10	7	10.35 — 12.65	16.74 — 19.26	120	60	25W — 32V — A-19	13
14	10		18		S-11	SC	C-2R	1¼	1/32	⊕	10	1000	14.2	10	7	12.49 — 15.90	16.74 — 19.26	115	60	25W — 32V — A-19	14
15	10		40		A-15	3PS	C-2V	2 3/16	1/64		10	1500	13.7	10	7	12.33 — 15.07	37.2 — 42.8	120	60	60W — 115V — A-21	15
15A	10		40		A-15	2PS	C-2V	2 7/32	1/64		10	1500	13.7	10	7	12.33 — 15.07	37.2 — 42.8	120	60	60W — 115V — A-21	15A
16	12	.12			S-11	SC	C-2VS	1¼	1/16	⊕	12	1000	8.								16
17	12	.3			S-11	SC	C-2VS	1¼	1/32	⊕	12	1000	△ 2.4	10	12	2.16 — 2.64	3.17 — 4.03	100	45		17
19	12		9		G-16½	2PS	C-2R	1.91	1/64		12	1500	10.8	12	7	9.5 — 12.1	8.48 — 9.76	120	60	9W — 12V — G-16½	19
20	12-16			21	S-8	SC	C-2R	1¼	A	⊕	12.8	300	△ .81	△ 9	□ 10	.74 — .89	□ 19. — 23.2	105	45	21CP — 6-8V — S-8	20
21	12-16			21	S-8	DC	C-2R	1¼	A	⊕	12.8	300	△ .81	△ 9	□ 10	.74 — .89	□ 19. — 23.2	105	45	21CP — 6-8V — S-8	21
22	12	.17			T-2	SLIDE	C-21		*		12										22
23	12-16			3	G-6	SC	C-2R	¾	*	⊕	13	1000	△ 1.56	△ 12	□ 15	1.39 — 1.75	2.6 — 3.46	115	30		23
24	12-16			3	G-6	DC	C-2R	¾	*	⊕	13	1000	△ 1.56	△ 12	□ 15	1.39 — 1.75	2.6 — 3.46	115	30		24
25	12-16			3	G-6	MS	C-2R	⅞			13	1000						115	30		25
26	14		5		S-14	MED.	S-1	2½			14	1500	7.7								26
26A	14	.2			G-6	SC	C-2VS	¾			14	1000	6.8								26A
27	20	.06-.085			T-2	SLIDE	C-21		*		20										27
28	60		5		S-14	MED.	C-9	2½			60	1500	7.9								28
29	60		20		S-14	MED.	CARBON		**		60										29
30	64		6		S-6	SC	C-7A	1 1/16			64	1500	7.5								30
31	75			2	S-8	MS	CARBON		**		75										31
32	125		10		S-11	SC	C-7A	1¼			125	1500	8.2								32

EXPLANATIONS:

2PS=2 Pin rebasing sleeve (US&S Co.).
3PS=3 " " " (GRS Co.).
SC=Single contact bayonet candelabra base.
DC=Double " " " "
CAN.=Candelabra screw base.
MS=Miniature screw base.
MED.=Medium " "

□= Spherical candle power.
SLIDE=Telephone switchboard type base.
S–As in C-2VS=Supported filament.
A–Under precision.=Axial alignment 0.03 in. and light center length 0.04 in.
R=Rounded filament.—V="V" Shaped filament.
⊖=Plane of base pins parallel to plane of filament.
⊕= " " " " at 90 deg. angle to plane of filament.
△=Watts per spherical candle power.

NOTES: Lamps to be furnished in accordance with N.Y.C. System Specifications: *=No. 3015A—**=No. 3015.

Values shown in column headed "Precision" indicate maximum permissible variation of filament from correct location. R.P. 11 Bulbs may be substituted for S-11 and A-15.

Plan rev'd 12-13-1938 and renumbered 750 was old No. 88 Issue: 1 of 2-27-35. Redrawn on large sh. 5-29-39.

SIGNAL AND TRAIN CONTROL COMMITTEE **750C**

NEW YORK CENTRAL SYSTEM

SIGNAL ELECTRIC LAMPS

8-26-1939
12-14-1940
3-1-1943

(CONT'D ON PAGE)

1 PURPOSE

(a) This specification is for the purpose of providing One-Direction Highway Crossing Flashing Light Lamp Unit in accordance with A.A.R., Signal Section Specification 190 except as modified herein.

2 ORDERING REFERENCE

. . . One-Direction highway crossing flashing light lamp unit in accordance with N.Y.C.S., S.&T.C.C. Specification 760.

3 PLANS

(a) Plans referred to in this specification form an essential part thereof.

4 LAMP CASE

(a) Body and door of lamp case shall be of die cast alloy, gray cast iron or cast aluminum.

1. Die cast alloy shall be not less than ⅛″ thick, with a minimum of 1/16″ where draft is required in manufacturing process and in accordance with A.S.T.M. current specification B86, Alloy Number XX111.
2. Gray cast iron shall be not less than ¼″ thick and in accordance with A.S.T.M. current specification A48, Class 20.
3. Cast aluminum shall be not less than 3/16″ thick, with a minimum of ⅛″ where draft is required in manufacturing process and in accordance with A.S.T.M. current specification B26, Alloy CS 22 or S2.

(b) The door shall open in front, with hinges at side, and be provided with means for compressing the door against the lamp body and fastening same. The door at locking point shall be extended and bored to shield cap screw with head fitting Raco Key 99-7.

(c) Lamp case body shall project not more than 3½″ to the rear of the center line of the supporting fixture.

5 ROUNDELS

(a) Roundels shall be in accordance with A.A.R., Signal Section Specification 69 except as modified herein.

(b) Roundels shall be Highway Crossing Red, 8⅝″ diameter, 30 degree horizontal spread, Corning Code 553361 or Kopp No. RR 4562.

(c) When specified, roundels shall be Highway Crossing Red 8⅝″ diameter, 30 degree horizontal spread with 15 degree downward deflection, Corning Code 553311 or Kopp No. RR 4564.

(d) Transmission value shall not be less than 220 or more than 310.

6 RECEPTACLE

(a) Lamp case shall be provided with a candelabra bayonet base socket, mounted on rigid support, suitably insulated from case and reflector, for single contact lamp having light center length of 1¼″. The lamp socket shall be provided with a suitable spring for center contact to insure proper contact between socket and lamp. The axis of the lamp socket shall coincide with the axis of the reflector and the socket shall be arranged so that when an accurate lamp is in position, the plane of filament will be vertical and the light center of filament at focal point of reflector. The lamp socket shall be adjusted and secured in position by the manufacturer.

7 HOOD

(a) Hood shall be made of corrosion-resisting metal and shall be not less than 0.037 inches thick.

8 BACKGROUNDS

(a) Backgrounds shall be 20 inches in diameter and made of corrosion-resisting metal and shall be not less than 0.045 inches thick. Design shall be such that it can be mounted on unit in the field without the use of special tools.

(b) Background shall be furnished with each lamp unit unless otherwise specified.

9 PAINT AND PAINTING

(a) Paint and painting shall be in accordance with N.Y.C.S., S.&T.C.C. Instruction 350.

10 BINDING POSTS

(a) Binding posts, nuts and washers shall conform to detail 107020 A.A.R. Drawing No. 1070.

(b) Material for binding posts shall be nickel-copper or copper-silicon alloy with cold upset and rolled thread, and shall meet the physical requirements specified on A.A.R. Drawing No. 1070.

(c) Binding posts shall be mounted so they cannot be turned in base or frame to which applied. They shall be properly insulated from each other and other metallic parts, and shall be spaced not less than one inch centers.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

760B

9-17-1947

ONE-DIRECTION HIGHWAY CROSSING FLASHING-LIGHT LAMP UNIT
SPECIFICATION

Approved by Representatives of lines shown.

Chairman

(Printed in U.S.A.)

RECEIVED
APR 27 1948
SPECIFICATION DEPT.

1 PURPOSE

(a) This specification is for the purpose of providing an electric light unit of the reflector type for highway crossing signals in accordance with A.A.R. Signal Section Specification 190, Manual Part 166 except as modified herein.

2 ORDERING REFERENCE

. . . Electric light unit for highway crossing signal, reflector type, in accordance with N.Y.C.S., S. & T.C.C. Specification 760.

3 PLANS

(a) Plans referred to in this specification form an essential part thereof.

4 CASE

(a) Case and door of lamp case shall be of die cast zinc alloy or gray cast iron.

1. Die cast zinc alloy shall be not less than $\frac{1}{8}''$ thick, with a minimum of $\frac{1}{16}''$ where draft is required in manufacturing process and in accordance with A.S.T.M. current specification B86, alloy number as required.
2. Gray cast iron shall be not less than $\frac{1}{4}''$ thick, with a minimum of $\frac{3}{16}''$ where draft is required in manufacturing process and in accordance with A.S.T.M. current Specification A48, Class 20.

(b) The door shall open in front, with hinges at side, and be provided with means for compressing the door against the case and fastening same. The door at locking point shall be extended and bored to shield cap screw with head fitting Raco Key 99-7.

5 ROUNDELS

(a) Roundels shall be in accordance with A.A.R. Signal Section Specification 69, Manual Part 136 except as modified herein.

(b) Roundels for use in electric light units on ground mast, unless otherwise specified, shall be Highway Crossing Red, $8\frac{3}{8}''$ diameter, 30 degree horizontal spread with 15 degree downward deflection, Corning Code 553311 or Kopp No. RR 4564.

(c) Roundels for use in electric light units on cantilever attachment, unless otherwise specified, shall be Highway Crossing Red $8\frac{3}{8}''$ diameter, 20 degree horizontal spread with 32 degree downward deflection Corning Code 554721.

(d) Transmission value shall not be less than 220 or more than 310.

6 LAMP RECEPTACLE

(a) Case shall be provided with a candelabra bayonet base socket, mounted on rigid support, suitably insulated from case and reflector, for single contact lamp having light center length of $1\frac{1}{4}''$. The lamp socket shall be provided with a suitable spring for center contact to insure proper contact between socket and lamp. The axis of the lamp socket shall coincide with the axis of the reflector and the socket shall be arranged so that when an accurate lamp is in position, the plane of filament will be vertical and the light center of filament at focal point of reflector. The lamp socket shall be adjusted and secured in position by the manufacturer.

7 PAINT AND PAINTING

(a) Paint and painting shall be in accordance with N.Y.C.S., S. & T.C.C. Instruction 350.

8 BINDING POSTS

(a) Unless otherwise specified, minimum tensile strength shall be 2300 lbs.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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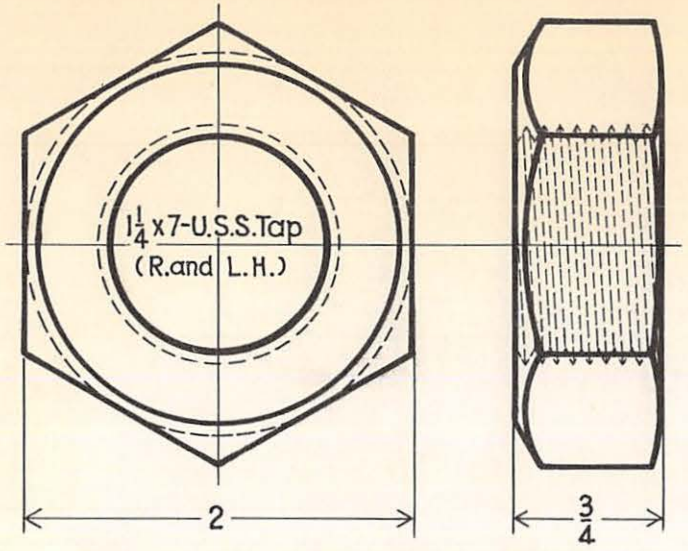
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

760C
3-30-1940
9-17-1947
9-5-1951

ELECTRIC LIGHT UNIT
FOR HIGHWAY CROSSING SIGNAL
REFLECTOR TYPE
SPECIFICATIONS

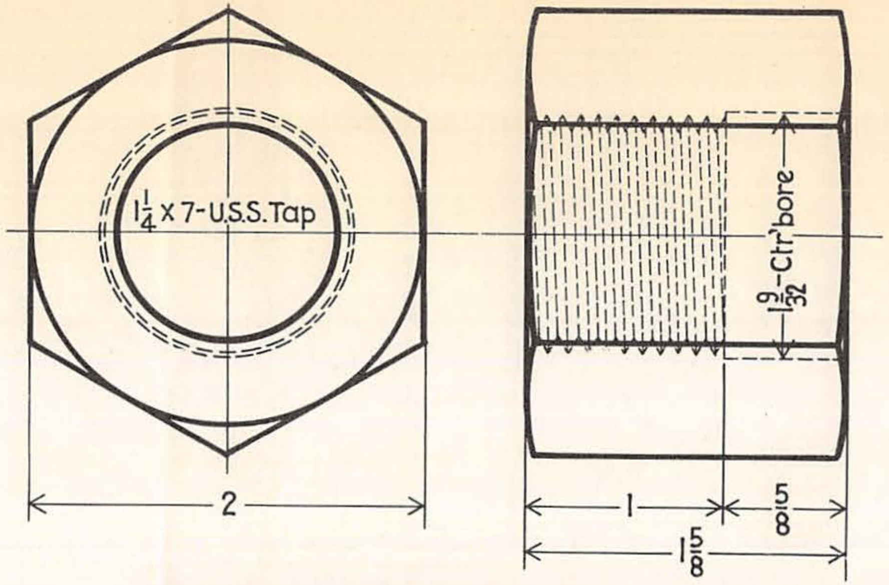
Approved by Representatives of lines shown.
Corcoran
Chairman.

Printed in U.S.A.



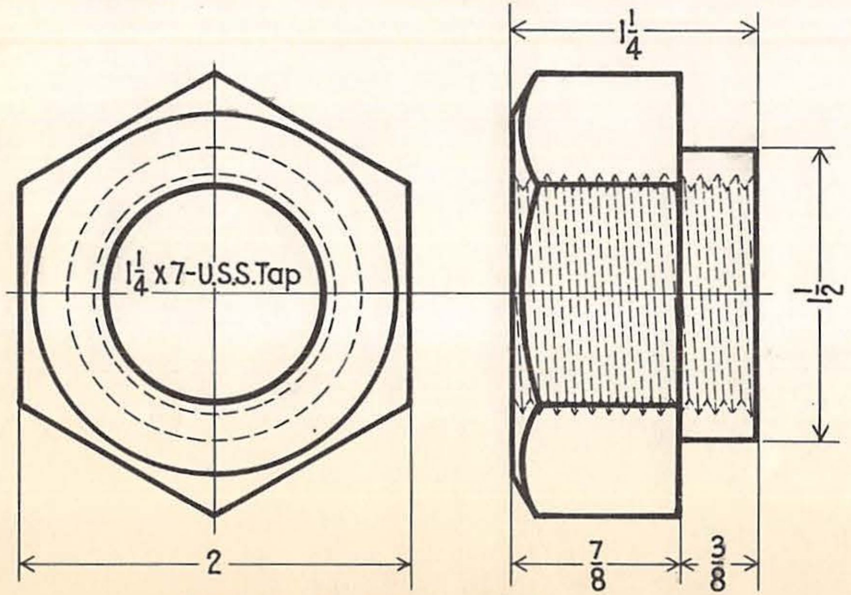
$1\frac{1}{4}$ x 7-U.S.S.Tap
(R.and L.H.)
2
$\frac{3}{4}$

800-1 JAM NUT — R. H. THD. 52195. 8265 SH 164
800-2 " " — L. H. THD. 54229- " "



$1\frac{1}{4}$ x 7-U.S.S.Tap
$1\frac{9}{32}$-Ctr'bore
2
1
$\frac{5}{8}$
$1\frac{5}{8}$

800-3 COUNTERBORED NUT 25658 _8265 SH. 101



$1\frac{1}{4}$
$1\frac{1}{4}$ x 7-U.S.S.Tap
$1\frac{1}{2}$
2
$\frac{7}{8}$
$\frac{3}{8}$

800-4 SLEEVE NUT 195189 - 8265 SH. 333

(Bessemer Screw Stock)

NOTE: When ordering give number and name shown in large type.

0 1 2

Scale and dimensions given in inches

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

800

ISSUE	DATE
1	9-17-1910
2	6-24-1931

SPECIAL NUTS

Approved by Representatives of Lines shown.

JCMock
Chairman

WAH

1 PURPOSE

(a) This specification is for the purpose of providing resistance units for continuous service in signal circuits. It sets forth specific detail requirements representing modern signal practice recommended for new installations and for the replacement of existing material when general renewal or replacement becomes desirable.

2 PLANS AND SPECIFICATIONS

(a) Plans and specifications referred to in this specification form an essential part hereof.

3 TENDER

(a) The tender shall be for material, design and assembly meeting the requirements of this specification in its entirety.

4 MATERIAL AND WORKMANSHIP

(a) Material and workmanship shall be first-class in every respect.

(b) Materials used shall be of suitable thermal conductivity, having coefficients suited to one another and with no chemical action between them while in service.

5 TYPES

(a) Type A—Resistors shall be composed of a single coil, without taps, enclosed in a cylindrical metal cover.

(b) Type B—Resistors shall be composed of a single coil, without taps, enclosed in a rectangular metal cover.

(c) Type C—Resistors shall be composed of a series of coils, with taps, enclosed in a rectangular metal cover.

(d) Type D—Resistors shall be composed of a series of coils, with loop taps, enclosed in an oblong porcelain base.

(e) Type E—Resistors shall be composed of a series of coils, with loop taps, enclosed in an inverted porcelain cup with a porcelain base.

(f) Type F—Resistors shall be variable and composed of a single exposed coil.

6 PURCHASERS ORDER

(a) Purchasers order shall be prepared as follows:

1. Resistors, only, N.Y.C.S., S. & T.C.C. Specification 881.

Quantity	Type	Ohms	Watts	Taps
Specify	A	Specify		
"	B	"		
"	C	"	Specify	Specify
"	D	"		"
"	E	"		"
"	F	"		

2. Resistors, N.Y.C.S., S.&T.C.C. Specification 881, complete with bases 10772 or 10773, A.A.R.-S.S. Plan 1077.

Quantity	Type	Ohms
Specify	A	Specify
"	B	"

7 WIRE

(a) Resistance wire shall consist of a high-grade, iron free, bare conductor of uniform cross-section, free from flaws, scales and other imperfections, without weld, splice, or joint throughout its length between terminals.

(b) Conductor shall be of the largest commercial size that will provide the resistance specified, using the entire length of winding space

(c) Minimum size wire allowable shall be No. 38 A.W.G.

8 PORCELAIN

(a) Porcelain shall be in accordance with A.A.R.-S.S. Specification 144.

9 COMPOUND

(a) Compound shall not flow at less than 300 deg. F., nor crack or become brittle at 25 deg. below zero F., or absorb more than 0.20 per cent moisture after 100 hours submersion in pure water at 70 deg. F. Surface moisture to be removed before final weighing.

10 BINDING POSTS, NUTS AND WASHERS

(a) Binding posts, nuts and washers shall conform to detail 107010, A.A.R.-S.S. Plan 1070.

(b) Material for binding posts shall be nickel-copper or copper-silicon alloy, with cold upset and rolled thread, and shall meet the physical requirements specified on A.A.R. Drawing No. 1070.

(c) Binding posts shall be spaced with not less than 1 in. centers and mounted so they cannot be turned in the base or frame to which applied, properly insulated.

11 WINDINGS

(a) The winding pitch shall be uniform. The spaces between adjacent turns shall be not less than the conductor width or diameter.

12 TYPE A—RESISTORS

(a) Resistors shall be composed of a single coil, without taps, properly protected against corrosion and enclosed in a cylindrical metal cover.

(b) Core shall be of suitable insulating material, so formed, that no injury to the conductor is possible.

(c) Resistor shall be supported by Z-shaped No. 18 A.W.G. monel metal feet securely attached to the resistor core and slotted $\frac{5}{16}$ in. for No. 14 binding posts. One foot shall have slot parallel and the other foot shall have slot at right angles to the resistor body.

(d) Conductor shall be wound upon the core under such tension as will give an even and compact winding within the required temperature limits.

(e) The conductor shall be fastened to the feet, within the insulating material, with Everdur or monel metal bolts, provided with tumbled brass washers with rounded edges to prevent injury to the conductor.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P. & L.E.R.R.

881B

1-30-1940
9-23-1947

WIRE WOUND RESISTORS

Approved by Representatives of Lines Shown.
J. Corcoran
Chairman

(Printed in U.S.A.)

(f) The wound core shall be concentric within the metal enclosure with not less than 0.08 in. clearance. The space between the wound core and metal enclosure shall be completely filled with an insulating material which shall be free from injurious voids and provide an effective seat for the winding. The curing, drying, cleaning, impregnation and coating operations shall be continuous and at no time shall the unfinished resistors be subjected to conditions where they may absorb moisture before the final finishing coating is applied.

(g) The final finishing coating of exposed portions of the insulating material and the metal cover shall be 2 coats of Glyptal, each coat of which shall be baked for not less than 90 minutes at 200 deg. to 225 deg. Fahrenheit.

(h) The completed unit shall not be adversely affected by temperature, moisture, corrosive gases, or salt air as ordinarily encountered in normal railroad service.

(i) Characteristics:
Resistance 1000 ohms or less as specified.
Diameter of body $\frac{15}{16}$ in.
Length of body 4 in.
Binding post spacing 5⅛ in.
Test rating 40 watts.
Continuous service 16 watts.

13 TYPE B—RESISTORS

(a) Resistors shall be composed of a single coil, without taps, properly protected against corrosion and enclosed in a rectangular metal cover.

(b) Core—Supports—Conductor—Insulation—Cover—Unit. Paragraphs 12(b) (c) (d) (e) (f) (g) and (h) apply.

(c) Characteristics:

Types	B1	B2	B3	B4	B5	B6
Maximum resistance	640	860	1260	1700	4450	7000
Minimum resistance	1.0	1.5	2.0	3.0	5.5	18.0
Width of body	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{15}{16}$
Height of body	2	2⅞	2	2⅞	3	4¾
Length of body	1¼	1¼	1⅞	1⅞	4	4
Binding post spacing	2⅜	2⅜	3	3	5⅛	5⅛
Test rating, watts	26	32	28	38	54	80
Continuous service, watts	13	16	14	19	27	40

14 TYPE C—RESISTORS

(a) Resistors shall be composed of a series of coils, with taps, properly protected against corrosion and enclosed in a rectangular metal cover.

(b) Core—Conductor—Insulation—Cover—Unit. Paragraphs 12(b) (d) (f) (g) and (h) apply.

(c) Resistor unit shall be secured to steel mounting brackets which shall also support a terminal board of ⅜ in. ebony asbestos of sufficient width and length for the resistance unit specified.

(d) Terminal board shall be marked to show the resistance between binding posts.

(e) Assembled resistors shall be rated for continuous service at wattage specified and for test at twice the wattage specified.

(f) The lead wires shall be secured between washers on binding posts.

(g) Lead wires shall be firmly held in place within the resistor body to avoid any strains on the joints.

(h) Connection between conductor and lead wires beneath the insulating material, shall be made with Everdur or monel metal bolts, provided with tumbled brass washers with rounded edges to prevent injury to conductor or lead wires.

(i) Characteristics:
Resistance as specified.
Maximum width of body 3$\frac{27}{32}$ in.
Maximum height overall 7¼ in.
Maximum length overall 9⅝ in.
Mounting bolt spacing 6⅞ in., or 8⅞ in.
Continuous service watts as specified.

15 TYPE D—RESISTOR

(a) Resistors shall be composed of a series of coils, with loop taps, enclosed in an oblong porcelain base and sealed with compound.

(b) The conductor shall be wound in small coils, between and securely fastened to, the binding posts within the base.

(c) The conductor of the resistor shall also act as lead wire to the terminal posts by being looped, without crossing wire, around the intermediate posts and formed into a wire eye on both end posts.

(d) The conductor shall be of the following sizes for the resistances shown with taps at:

Total Resistance	Wire Size	Taps
1.0 ohm	#17 A.W.G.	0.1—0.2—0.3—0.4 ohms
1.5 “	#19 “	0.1—0.2—0.4—0.8 “
2.0 “	#19 “	0.2—0.3—0.5—1.0 “
2.4 “	#20 “	0.2—0.4—0.8—1.0 “
21.0 “	#30 “	3.0—5.0—6.0—7.0 “

(e) Characteristics:
Resistance as specified.
Width 1 in.
Height overall 2⅞ in.
Length overall 5 in.
Test rating 6 watts at not exceeding 250 deg. F.
Continuous service 6 watts.

16 TYPE E—RESISTORS

(a) Resistors shall be composed of a series of coils, with loop taps, enclosed in an inverted porcelain cup with a porcelain base.

(b) Conductor:
Paragraphs 15 (b) and (c) apply.

(c) Coils shall be separated from each other by heavy mica partitions.

(d) The conductor shall be of the following sizes for the resistances shown with taps at:

Total Resistance	Wire Size	Taps
5.0 ohm	#19 A.W.G.	0.1–0.2–0.3–0.4–1.0–1.0–2.0 ohm
10.0 ohm	#22 A.W.G.	0.1–0.2–0.2–0.5–1.0–3.0–5.0 ohm

(e) Characteristics:
Resistance as specified.
Diameter 4$\frac{5}{16}$ in.
Height overall 4¾ in.

5 Ohm unit:—Test rating 210 watts.
Continuous service 31 watts.

10 Ohm unit:—Test rating 160 watts.
Continuous service 27 watts.

SIGNAL AND TRAIN CONTROL COMMITTEE | 881B
NEW YORK CENTRAL SYSTEM
WIRE WOUND RESISTORS
3-30-1940
9-23-1947

(Printed in U.S.A.)

17 TYPE F—RESISTORS

(a) Resistors shall be variable and composed of a single exposed coil.

(b) Conductor shall be wound upon a grooved porcelain core under such tension as will give an even and compact winding and operate within the required temperature limits.

(c) Resistances shall be available at binding posts in not more than 10 per cent steps by means of a sliding contact, operating along a slotted guide of corrosion resisting metal, and securely held at all contact points by locknuts which can be tightened sufficiently without the use of a wrench to avoid movement due to vibration. Guides shall be of sufficient strength to maintain contact pressure and be securely fastened.

(d) The conductors shall be of the following sizes:
1 ohm #17 A.W.G.
2 ohm #20 A.W.G.
3 ohm #22 A.W.G.
4 ohm #24 A.W.G.
5 ohm #24 A.W.G.

(e) Characteristics:
Resistance as specified.
Width 1$\frac{1}{16}$ in.
Height overall 2¾ in.
Length overall 5$\frac{3}{16}$ in.
Test rating 58 watts.
Continuous service 10 watts.

18 RESISTANCE TEST

(a) The resistance measured at 68 deg. F. shall not vary more than 5 per cent from the nominal value.

19 TEMPERATURE

(a) Mercury thermometer supported vertically shall be used. Bulb shall be well covered to exclude surrounding air and applied to the hottest accessible part of resistor coil or unit. Reading shall be taken after a steady value has been reached.

(b) With all windings carrying current the temperature rise, unless otherwise specified herein, shall not exceed 482 deg. F. for test load and 135 deg. F. for service load based on a room temperature of 68 deg. F. The service current to be calculated by taking the square root of the quotient obtained by dividing the continuous service watts by the resistance.

(c) While carrying the current specified in 19 (b) long enough to attain a constant temperature, resistances shall not emit smoke or steam.

20 DIELECTRIC REQUIREMENTS

(a) Assembled resistors shall withstand for 1 minute an insulation test, at place of manufacture, of 1000 volts A.C. between all parts of electric circuits and other metallic parts in insulated therefrom.

(b) A surface leakage distance of not less than ¼ in. shall be provided between any exposed metallic part of the resistor carrying current and any other metallic part thereof.

21 IDENTIFICATION

(a) Resistors shall be permanently marked with the name of manufacturer, year manufactured, resistance in ohms, and service current in amperes.

22 INSPECTION

(a) Purchaser may inspect material at all stages of manufacture.

(b) Purchaser may inspect the completed product to determine that the requirements of this specification have been met.

(c) If material has not been accepted at point of production and if, upon arrival at destination, it does not meet the requirements of this specification, it may be rejected, and the Contractor, upon request, shall advise the Purchaser what disposition is to be made of the rejected material.
Contractor shall pay all freight charges.

(d) If Purchaser is to make inspection at point of production, it shall be so stated.

23 TESTS

(a) Tests may be made at point of production, or on samples submitted, and may also be made at destination.

(b) Contractor shall give the Purchaser sufficient notice of time when material will be ready for testing.

(c) Contractor shall provide, at point of production, apparatus and labor for making required tests under supervision of the Purchaser.

(d) If tests are to be made at point of production, the Purchaser shall so state and also indicate which of the tests herein specified are to be made and what portion of the material shall be tested.

(e) At least 1 per cent, but not less than 3 resistors shall be selected at random from each lot for inspection and tests.

24 PACKING

(a) Material shall be so prepared as to permit convenient handling and to protect against loss or damage during shipment.

(b) Each resistor shall be shipped in an individual cardboard container having plainly marked thereon the items specified under identification.

25 MARKING

(a) Purchaser's order, requisition and package number, name of Consignor, and name and address of Consignee, shall be plainly marked on outside of package.

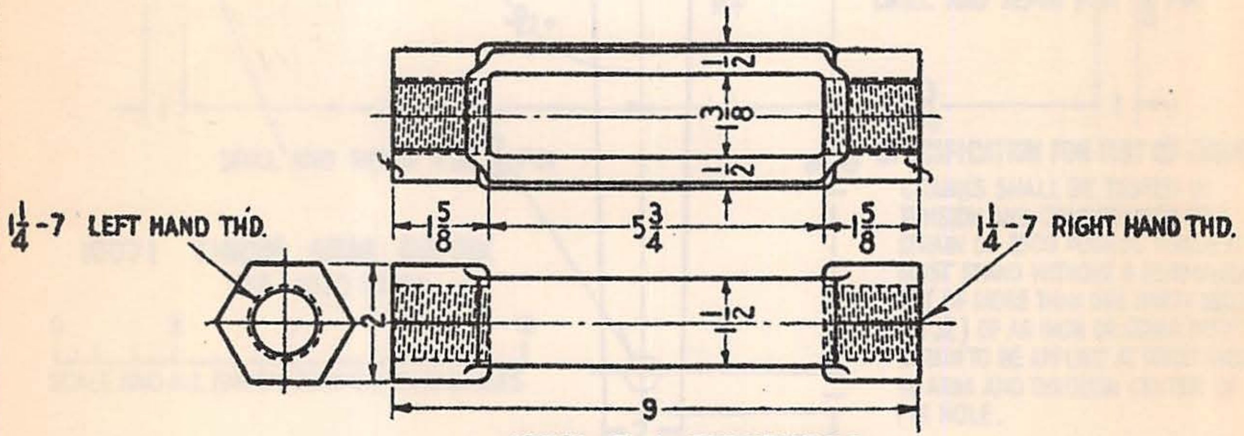
(b) Detail list of loose pieces, containers and their contents shall be furnished for each shipment.

26 WARRANTY

(a) Contractor shall warrant the material covered by this specification to be free from defects in material and workmanship under ordinary use and service, his obligation under this warranty being limited to manufacturing, at point of production, any part or parts to replace those which shall be found defective within 1 year after shipment to the Purchaser. This warranty shall not apply to any apparatus which shall have been repaired or altered in any way by anyone other than the Manufacturer thereof, so as to affect, in the Contractor's judgment, its proper functioning or reliability or which has been subject to misuse, negligence or accident.

SIGNAL AND TRAIN CONTROL COMMITTEE	881B
NEW YORK CENTRAL SYSTEM **WIRE WOUND RESISTORS**	3-30-1940 9-23-1947

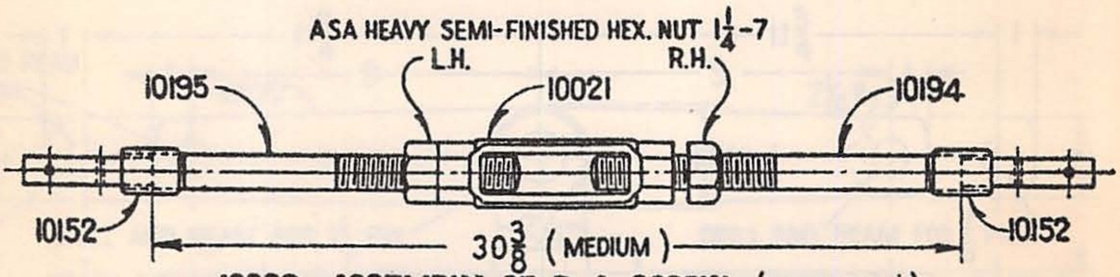
(Printed in U.S.A.)



$1\frac{1}{4}$-7 LEFT HAND THD.
$1\frac{1}{4}$-7 RIGHT HAND THD.
$1\frac{1}{2}$
$3\frac{1}{8}$
$1\frac{1}{2}$
$1\frac{5}{8}$
$5\frac{3}{4}$
$1\frac{5}{8}$
$1\frac{1}{2}$
2
9

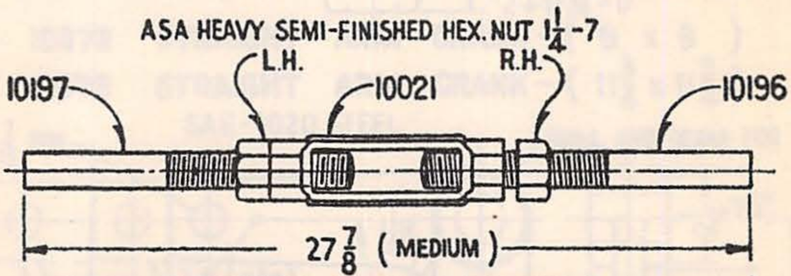
10021 P. A. TURNBUCKLE

SAE-1020 STEEL FORGED



ASA HEAVY SEMI-FINISHED HEX. NUT $1\frac{1}{4}$-7
L.H.
R.H.
10195
10021
10194
10152
10152
$30\frac{3}{8}$ (MEDIUM)

10022 ASSEMBLY OF P. A. SCREW (TANG ENDS)



ASA HEAVY SEMI-FINISHED HEX. NUT $1\frac{1}{4}$-7
L.H.
R.H.
10197
10021
10196
$27\frac{7}{8}$ (MEDIUM)

10023 ASSEMBLY OF P. A. SCREW (PLAIN ENDS)

0 3 6 9 12

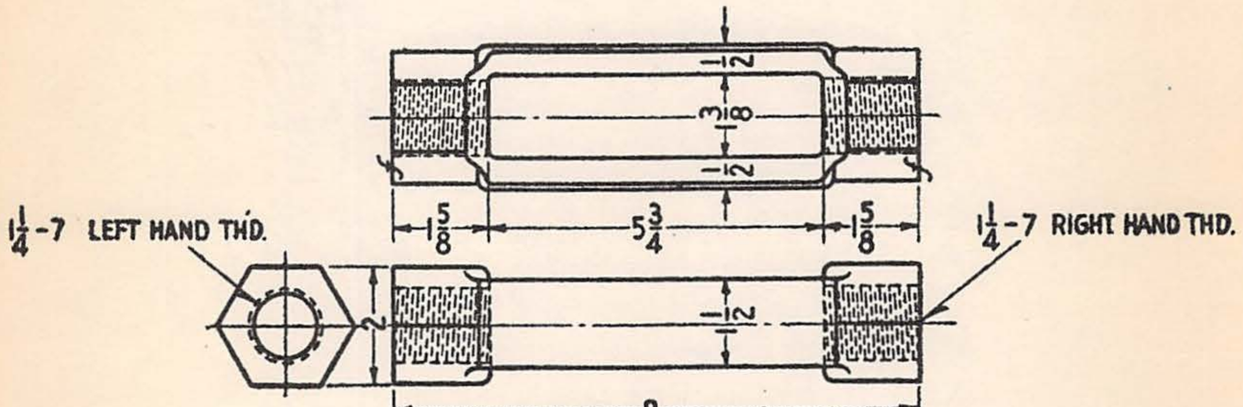
0 3 6

SCALES AND ALL DIMENSIONS
GIVEN IN INCHES

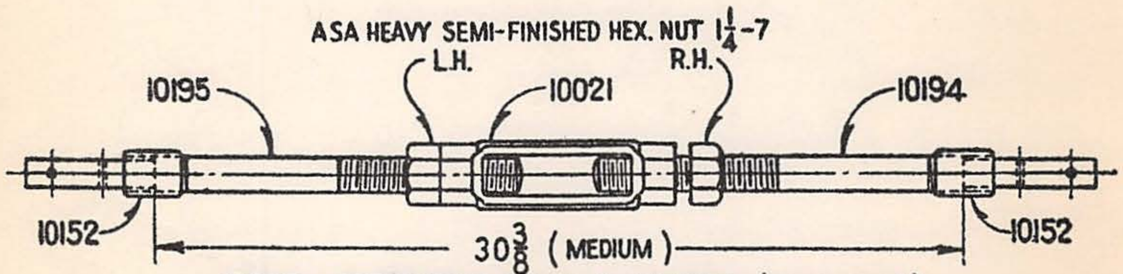
PIPE ADJUSTING SCREWS

(DETAILS AND ASSEMBLY)

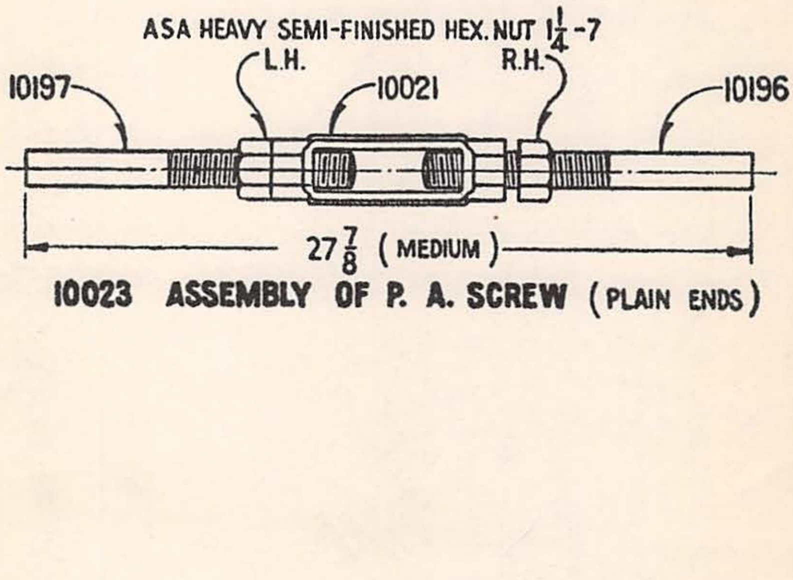
M-1940	OCT. 1940	MANUAL-FEB. 1914	DEC. 1908	AAR SIG. SEC. 1002B


$\frac{1}{2}$
$1\frac{3}{8}$
$\frac{1}{2}$
$1\frac{1}{4}$-7 LEFT HAND THD.
$1\frac{5}{8}$
$5\frac{3}{4}$
$1\frac{5}{8}$
$1\frac{1}{4}$-7 RIGHT HAND THD.
2
$1\frac{1}{2}$
9

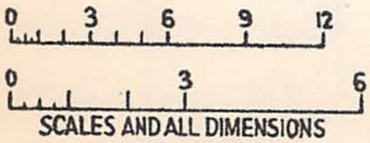
10021 P. A. TURNBUCKLE
SAE-1020 STEEL FORGED


ASA HEAVY SEMI-FINISHED HEX. NUT $1\frac{1}{4}$-7
L.H.
R.H.
10195
10021
10194
10152
10152
$30\frac{3}{8}$ (MEDIUM)

10022 ASSEMBLY OF P. A. SCREW (TANG ENDS)


ASA HEAVY SEMI-FINISHED HEX. NUT $1\frac{1}{4}$-7
L.H.
R.H.
10197
10021
10196
$27\frac{7}{8}$ (MEDIUM)

10023 ASSEMBLY OF P. A. SCREW (PLAIN ENDS)

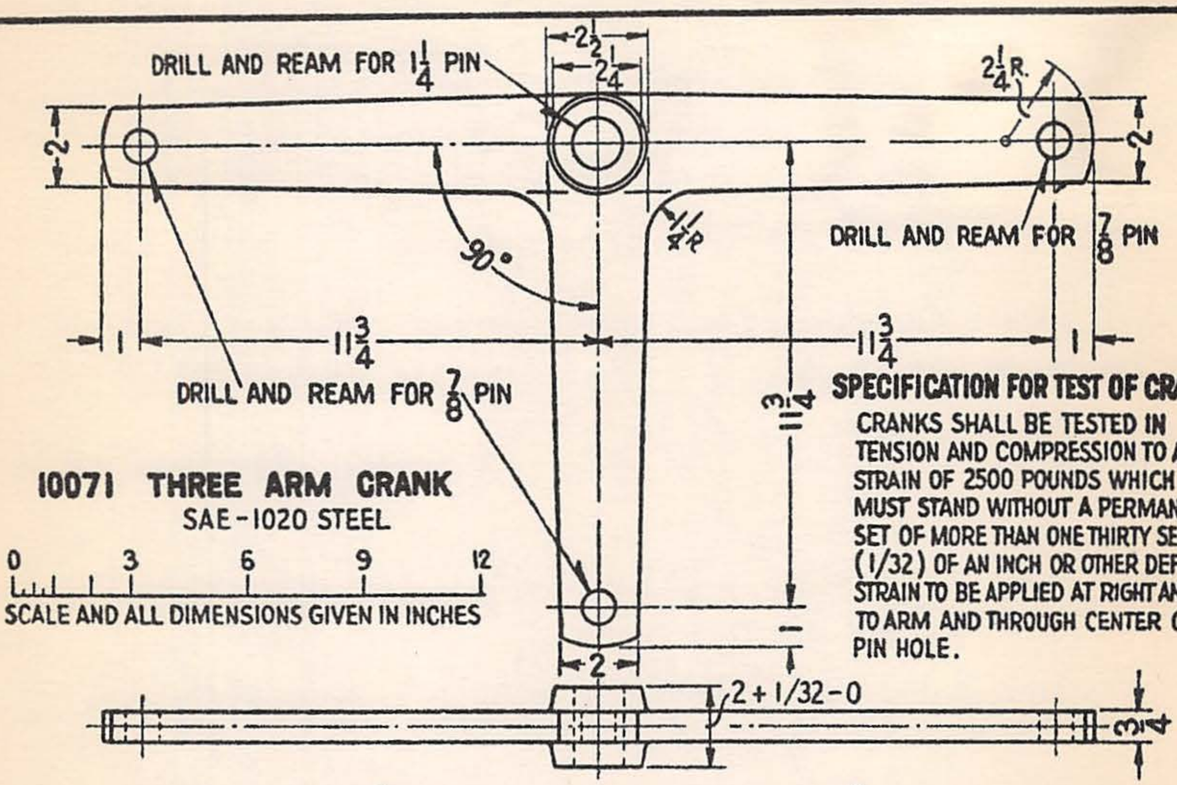


SCALES AND ALL DIMENSIONS
GIVEN IN INCHES

PIPE ADJUSTING SCREWS
(DETAILS AND ASSEMBLY)

M-1940 | OCT. 1940 | MANUAL-FEB. 1914 | DEC. 1908

AAR
SIG. SEC.
1002B


DRILL AND REAM FOR $1\frac{1}{4}$ PIN
$2\frac{1}{2}$
$2\frac{1}{4}$
$2\frac{1}{4}$R.
2
2
$\frac{1}{4}$R
90°
DRILL AND REAM FOR $\frac{7}{8}$ PIN
1
$11\frac{3}{4}$
$11\frac{3}{4}$
1
DRILL AND REAM FOR $\frac{7}{8}$ PIN
$11\frac{3}{4}$
1
2
2 + 1/32 − 0
$\frac{3}{4}$
0
3
6
9
12

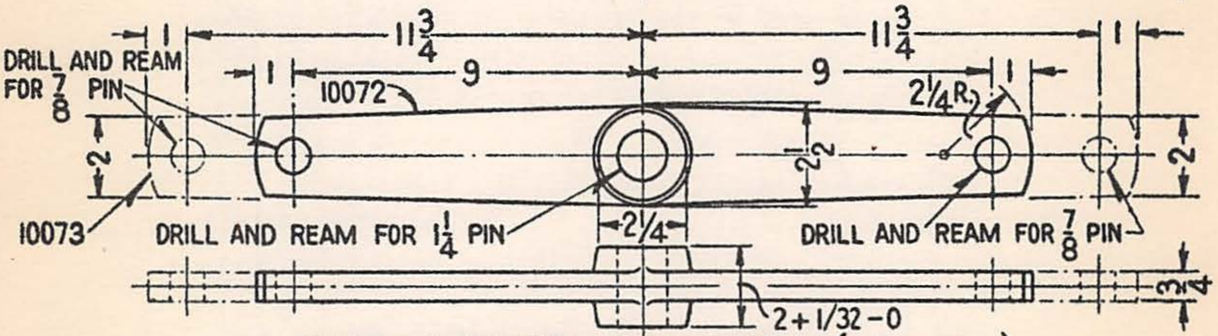
10071 THREE ARM CRANK

SAE-1020 STEEL

SCALE AND ALL DIMENSIONS GIVEN IN INCHES

SPECIFICATION FOR TEST OF CRANKS

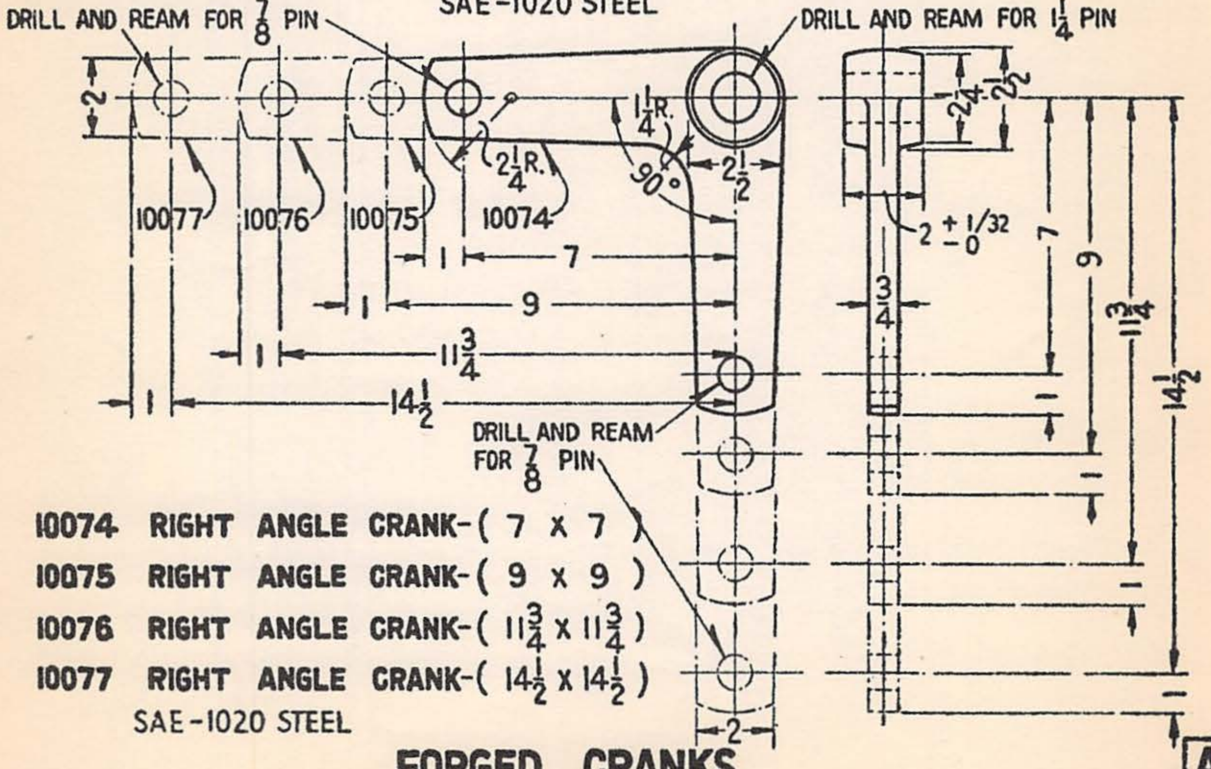
CRANKS SHALL BE TESTED IN TENSION AND COMPRESSION TO A STRAIN OF 2500 POUNDS WHICH IT MUST STAND WITHOUT A PERMANENT SET OF MORE THAN ONE THIRTY SECOND (1/32) OF AN INCH OR OTHER DEFECTS; STRAIN TO BE APPLIED AT RIGHT ANGLES TO ARM AND THROUGH CENTER OF PIN HOLE.


1
$11\frac{3}{4}$
$11\frac{3}{4}$
1
DRILL AND REAM FOR $\frac{7}{8}$ PIN
1
9
9
1
10072
$2\frac{1}{4}$R.
2
$2\frac{1}{2}$
2
10073
DRILL AND REAM FOR $1\frac{1}{4}$ PIN
$2\frac{1}{4}$
DRILL AND REAM FOR $\frac{7}{8}$ PIN
2 + 1/32 − 0
$\frac{3}{4}$

10072 STRAIGHT ARM CRANK – (9 x 9)

10073 STRAIGHT ARM CRANK – ($11\frac{3}{4}$ x $11\frac{3}{4}$)

SAE-1020 STEEL


DRILL AND REAM FOR $\frac{7}{8}$ PIN
DRILL AND REAM FOR $1\frac{1}{4}$ PIN
2
$1\frac{1}{4}$R.
$2\frac{1}{4}$R.
90°
$2\frac{1}{2}$
10077
10076
10075
10074
1
7
1
9
1
$11\frac{3}{4}$
1
$14\frac{1}{2}$
DRILL AND REAM FOR $\frac{7}{8}$ PIN
2
$2\frac{1}{4}$
$2\frac{1}{2}$
2 + 1/32 − 0
$\frac{3}{4}$
7
9
$11\frac{3}{4}$
$14\frac{1}{2}$

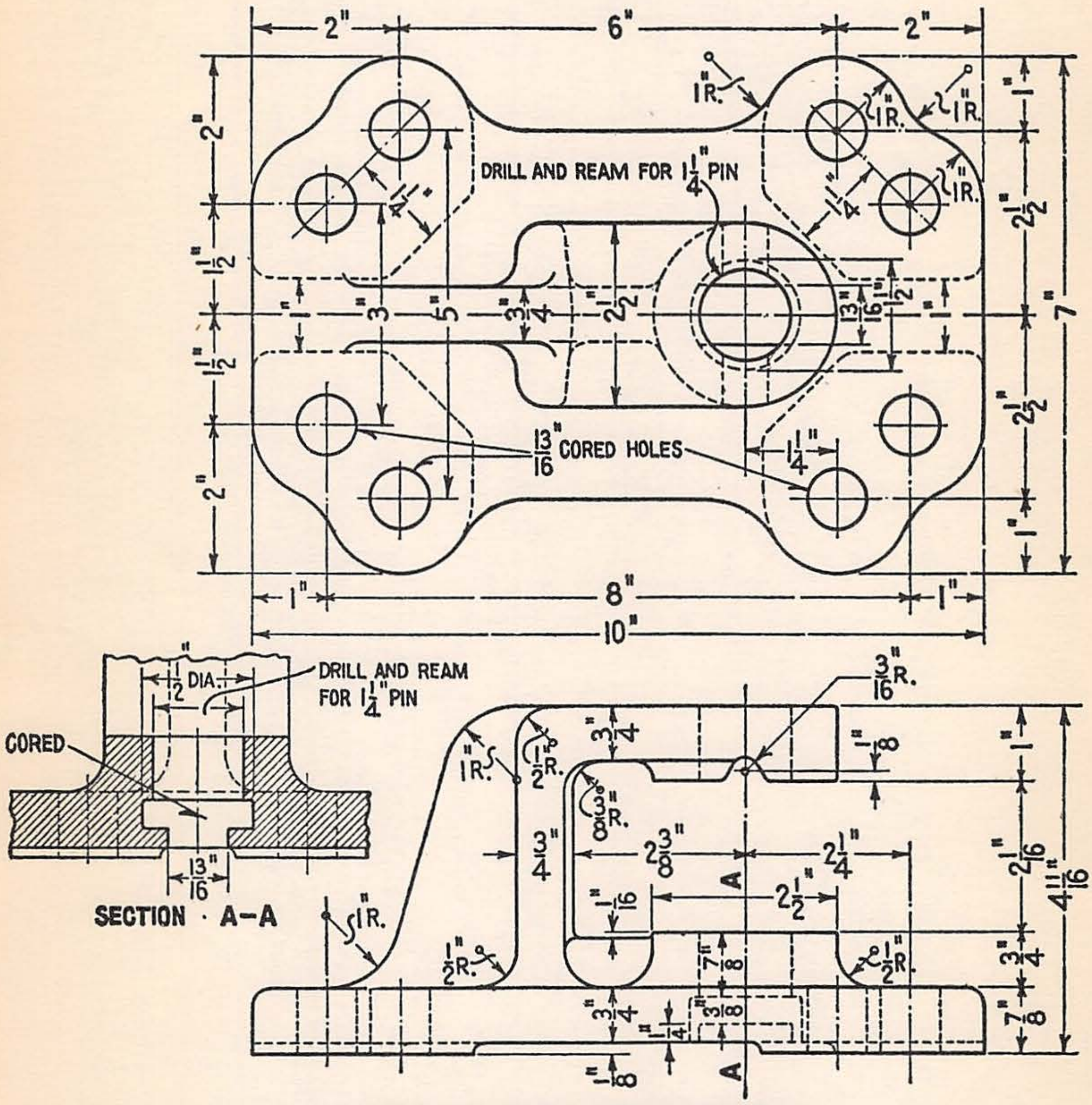
10074 RIGHT ANGLE CRANK – (7 X 7)
10075 RIGHT ANGLE CRANK – (9 x 9)
10076 RIGHT ANGLE CRANK – ($11\frac{3}{4}$ x $11\frac{3}{4}$)
10077 RIGHT ANGLE CRANK – ($14\frac{1}{2}$ x $14\frac{1}{2}$)

SAE-1020 STEEL

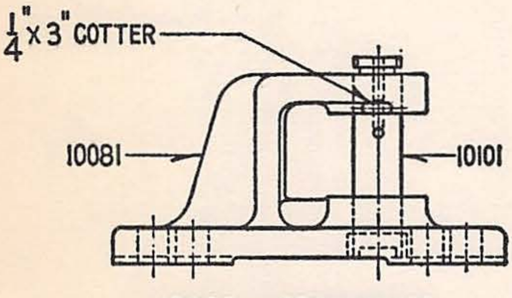
FORGED CRANKS
(DETAILS)

M-1940 | OCT. 1940 | MANUAL – NOV. 1913 | DEC. 1908

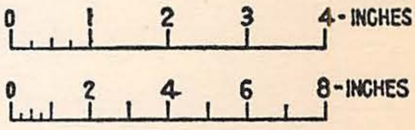
AAR
SIG. SEC.
1007B


2"
6"
2"
1" R.
1" R.
1" R.
1" R.
DRILL AND REAM FOR 1¼" PIN
4½"
1¼"
1"
2½"
7"
2"
1½"
1"
3"
5"
¾"
2½"
13/16"
1½"
1"
1½"
2½"
13/16" CORED HOLES
1¼"
2"
1"
1"
8"
1"
10"
½" DIA.
DRILL AND REAM FOR 1¼" PIN
CORED
13/16"
SECTION · A-A
3/16" R.
¾"
1" R.
½" R.
1/8"
1"
3/8" R.
¾"
2 3/8"
2¼"
A
2 1/16"
4 11/16"
1/16"
2½"
1" R.
½" R.
7/8"
½" R.
¾"
¾"
3/8"
7/8"
1/4"
1/8"
A

10081 ONE-WAY CRANK STAND
(CAST IRON)


¼" x 3" COTTER
10081
10101

10082 ASSEMBLY

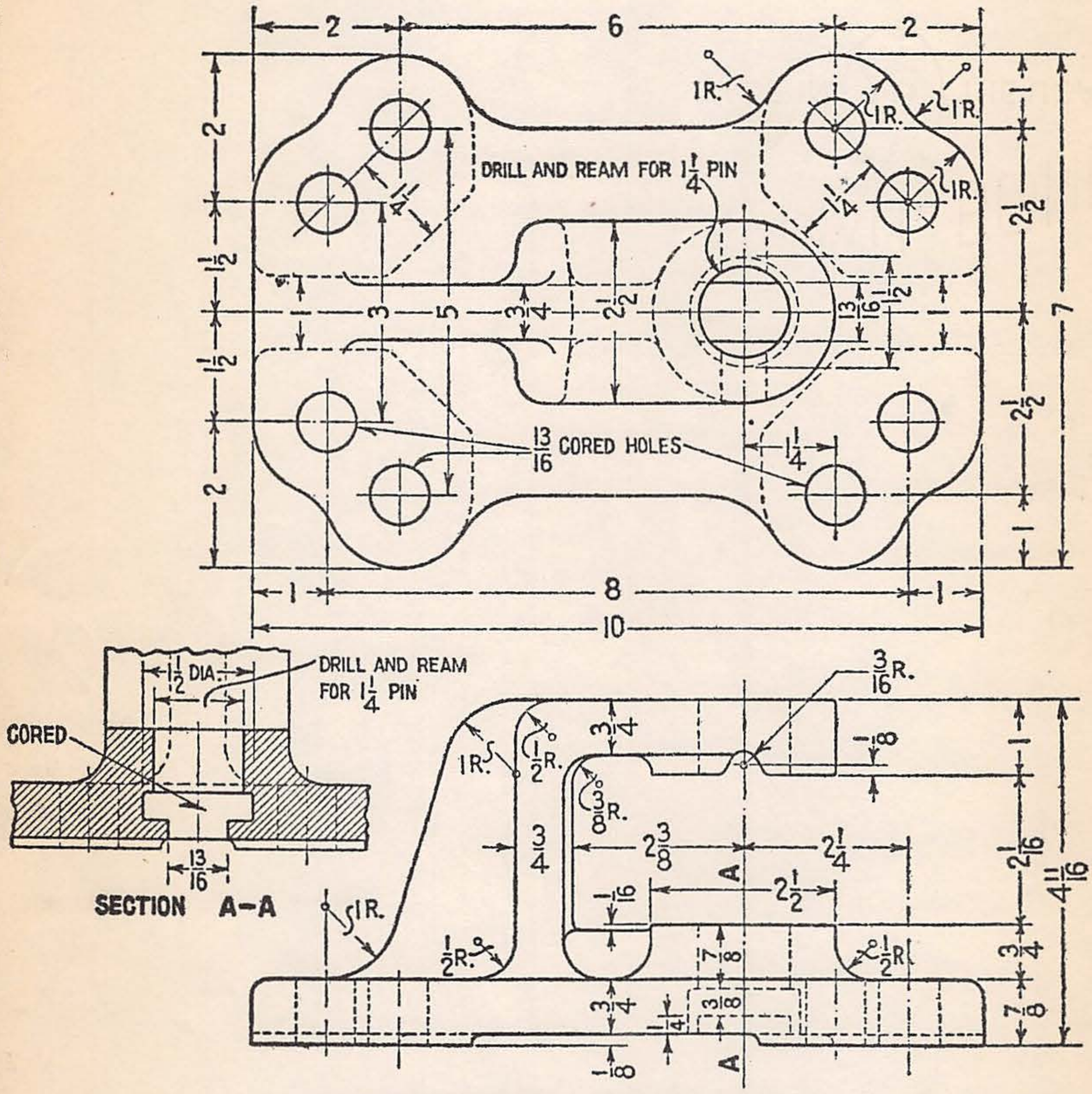

0
1
2
3
4-INCHES
0
2
4
6
8-INCHES

ONE-WAY HORIZONTAL CRANK STAND
(DETAILS)

							M-1927	MAR.1927	SEPT.1926	JUN.1913	DEC.1908

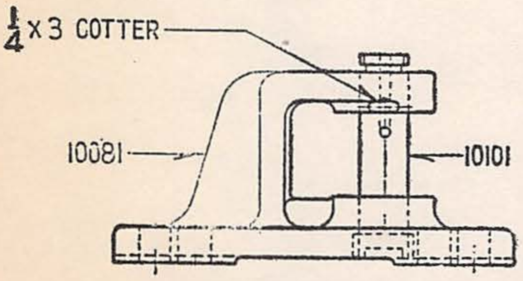
ARA
SIG. SEC.
1008B

Cast iron shall be in accordance with Specification for Gray Iron Castings.

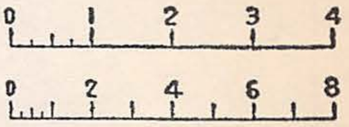

2
6
2
1 R.
1 R.
1 R.
1 R.
DRILL AND REAM FOR 1 1/4 PIN
4 1/4
1 1/4
2
1 1/2
1 1/2
2
3
5
3/4
2 1/2
13/16
1 1/2
1
2 1/2
7
2 1/2
1
13/16 CORED HOLES
1 1/4
1
8
1
10
1 1/2 DIA.
DRILL AND REAM FOR 1 1/4 PIN
CORED
13/16
SECTION A-A
3/16 R.
3/4
1 R.
1/2 R.
3/16 R.
1/8
1
3/4
2 3/8
2 1/4
A
2 1/2
1/16
2 1/16
4 11/16
1 R.
1/2 R.
7/8
1/2 R.
3/4
3/4
1/4
3/8
7/8
1/8
A

10081 ONE-WAY CRANK STAND

CAST IRON


1/4 x 3 COTTER
10081
10101

10082 ASSEMBLY


0
1
2
3
4
0
2
4
6
8

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

ONE-WAY HORIZONTAL CRANK STAND

DETAILS

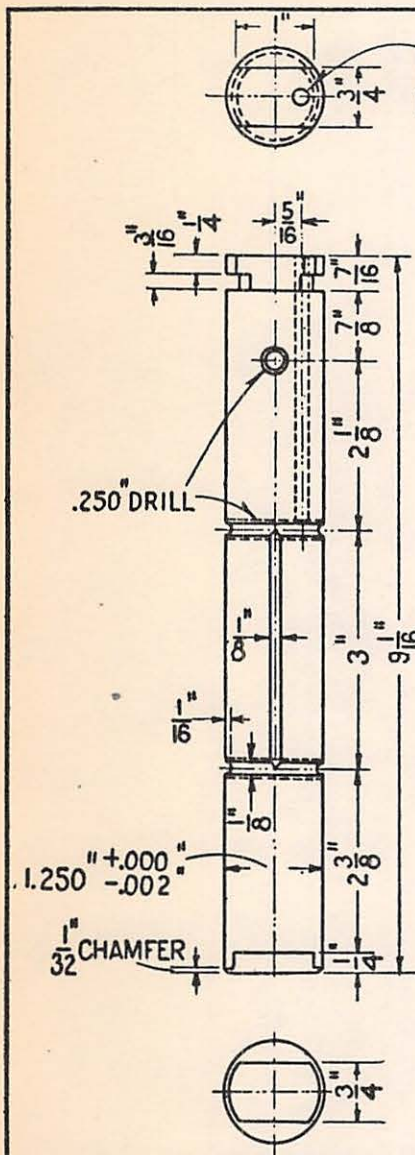
					M-1946	OCT. 1946	M-1927	MAR. 1927	SEPT. 1926	JUN. 1913	DEC. 1908

AAR
SIG. SEC
1008C

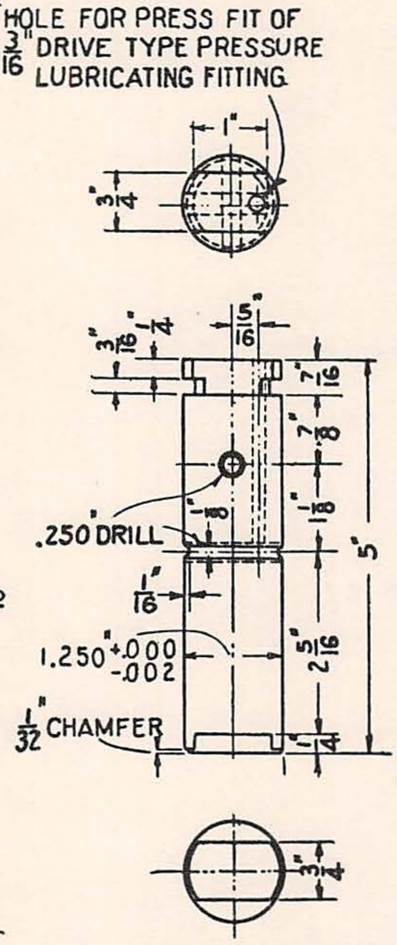
Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

PRINTED IN U. S. A.

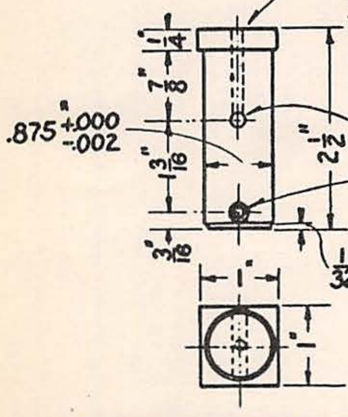
FEB
12
1948
SPECIFICATION DEPT.


1"
3/4"
5/16"
3/16"
1/4"
7/16"
7/8"
2 1/8"
.250" DRILL
1/8"
3"
9 1/16"
1/16"
1/8"
1.250" +.000" -.002"
2 3/8"
1/32" CHAMFER
1/4"
3/4"

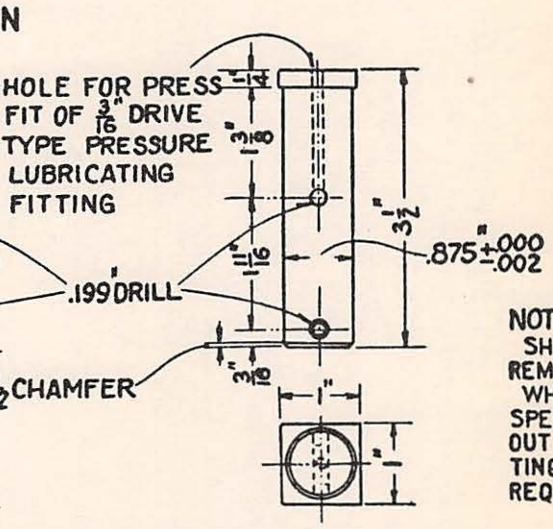
10103 THREE-WAY CRANK PIN
C. R. STEEL


HOLE FOR PRESS FIT OF 3/16" DRIVE TYPE PRESSURE LUBRICATING FITTING
1"
3/4"
5/16"
3/16"
1/4"
7/16"
7/8"
1 1/8"
.250" DRILL
1/8"
5"
1/16"
1.250" +.000 -.002
2 5/16"
1/32" CHAMFER
1/4"
3/4"

10101 ONE-WAY CRANK PIN
C.R. STEEL

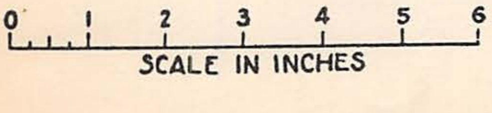

1/4"
7/8"
.875" +.000 -.002
1 3/16"
2 1/2"
3/16"
1"
1"

10105 STANDARD JAW PIN
MACHINERY OR C.R. STEEL


HOLE FOR PRESS FIT OF 3/16" DRIVE TYPE PRESSURE LUBRICATING FITTING
1/4"
1 3/8"
3 1/2"
.875" +.000 -.002
.199" DRILL
1 11/16"
1/32" CHAMFER
3/16"
1"
1"

10106 WIDE JAW PIN
MACHINERY OR C.R. STEEL

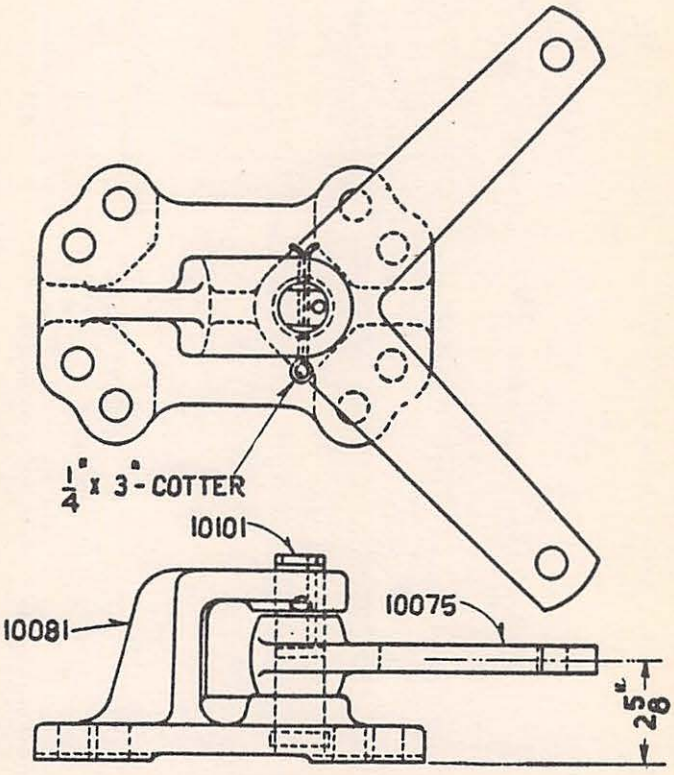
NOTES:
SHARP EDGES SHALL BE REMOVED FROM ALL HOLES.
WHEN ORDERING PINS SPECIFY WITH OR WITHOUT LUBRICATING FITTINGS. IF FITTINGS ARE REQUIRED, SPECIFY KIND.


0
1
2
3
4
5
6
SCALE IN INCHES

CRANK AND JAW PINS

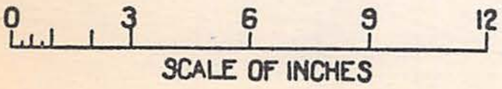
AAR
SIG. SEC.
1010E

M-1934	MAR1934	M-1929	SEP 1928	M-1927	MAR1927	SEP1926	JUL1920	DEC1919	SEP1915	M-1935 M-1913	MAR1935 DEC1908


1/4" x 3" - COTTER
10101
10081
10075
2 5/8"

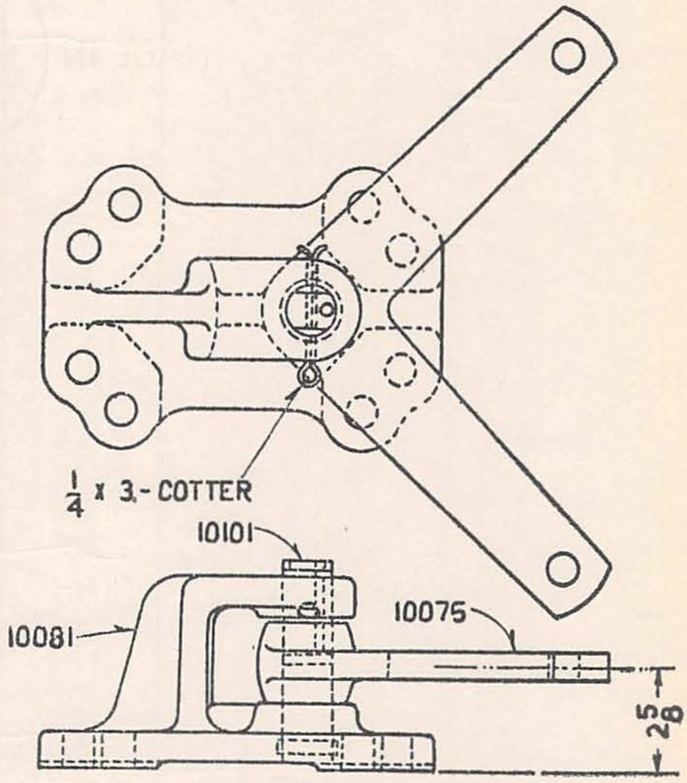
10115 ASSEMBLY

ASSEMBLY OF ONE-WAY CRANK STANDS
THREE-ARM CRANK
10111 - (WITH 10071)
STRAIGHT-ARM CRANKS
10112 - (WITH 10072)
10113 - (WITH 10073)
RIGHT-ANGLE CRANKS
10114 (WITH 10074)
10115 (WITH 10075)
10116 (WITH 10076)
10117 (WITH 10077)


0
3
6
9
12
SCALE OF INCHES

ONE-WAY HORIZONTAL CRANK STAND ASSEMBLY

					M-1934	MAR1934	M-1927	MAR1927	SEP1928	M-1913	DEC1908	ARA SIG.SEC. 1011C


$\frac{1}{4}$ x 3 - COTTER
10101
10081
10075
$2\frac{5}{8}$

10115 ASSEMBLY

ASSEMBLY OF ONE-WAY CRANK STANDS

THREE-ARM CRANK

10111 - WITH 10071

STRAIGHT-ARM CRANKS

10112 - WITH 10072
10113 - WITH 10073

RIGHT-ANGLE CRANKS

10114 WITH 10074
10115 WITH 10075
10116 WITH 10076
10117 WITH 10077

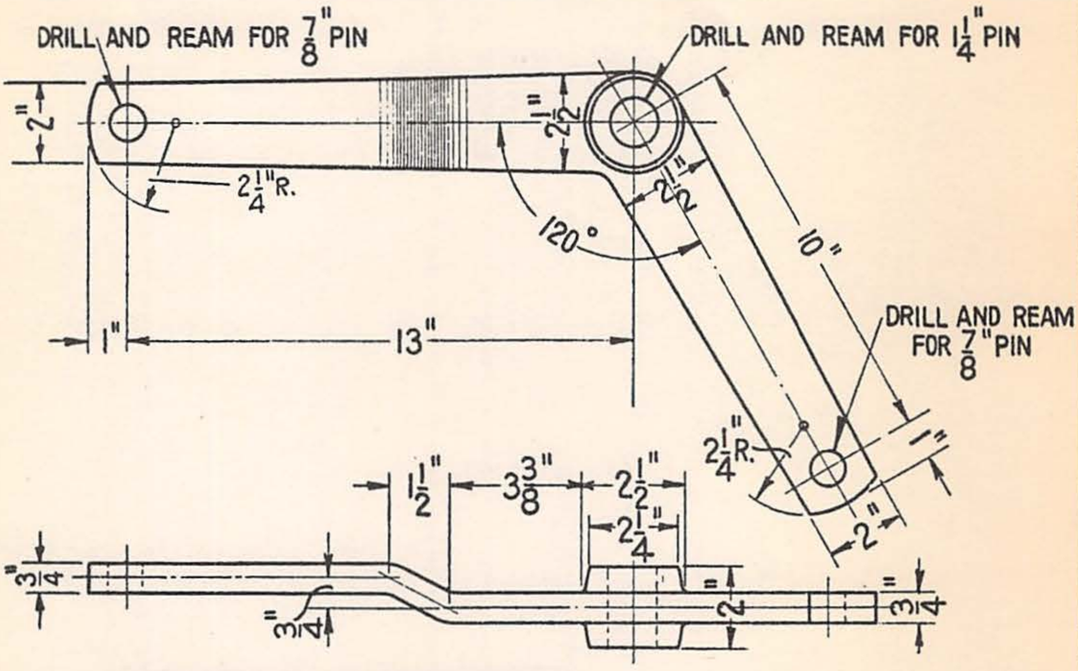
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

ONE-WAY HORIZONTAL CRANK STAND ASSEMBLY

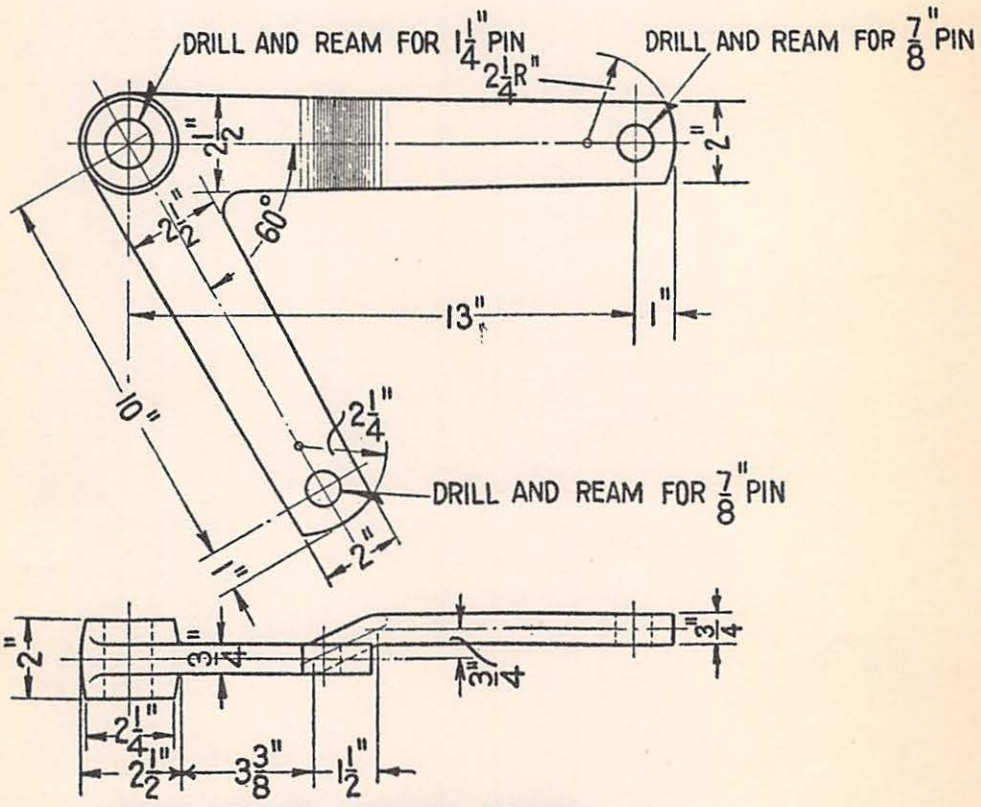
			M-1946	OCT. 1946	M-1934	MAR 1934	M-1927	MAR 1927	SEP 1920	M-1913	DEC 1908

AAR
SIG. SEC.
1011D

PRINTED IN U. S. A.

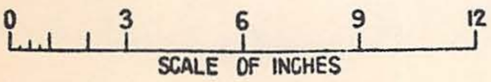

DRILL AND REAM FOR $\frac{7}{8}$" PIN
DRILL AND REAM FOR $1\frac{1}{4}$" PIN
2"
$2\frac{1}{2}$"
$2\frac{1}{4}$" R.
$2\frac{1}{2}$"
120°
10"
DRILL AND REAM FOR $\frac{7}{8}$" PIN
1"
13"
$2\frac{1}{4}$ R.
1"
2"
$1\frac{1}{2}$"
$3\frac{3}{8}$"
$2\frac{1}{2}$"
$2\frac{1}{4}$"
$\frac{3}{4}$"
$\frac{3}{4}$"
2"
$\frac{3}{4}$"

10132 OBTUSE ANGLE CRANK
(FORGED STEEL)


DRILL AND REAM FOR $1\frac{1}{4}$" PIN
$2\frac{1}{4}$R"
DRILL AND REAM FOR $\frac{7}{8}$" PIN
$2\frac{1}{2}$"
2"
$2\frac{1}{2}$"
60°
13"
1"
10"
$2\frac{1}{4}$"
DRILL AND REAM FOR $\frac{7}{8}$" PIN
1"
2"
2"
$\frac{3}{4}$"
$\frac{3}{4}$"
$\frac{3}{4}$"
$2\frac{1}{4}$"
$2\frac{1}{2}$"
$3\frac{3}{8}$"
$1\frac{1}{2}$"

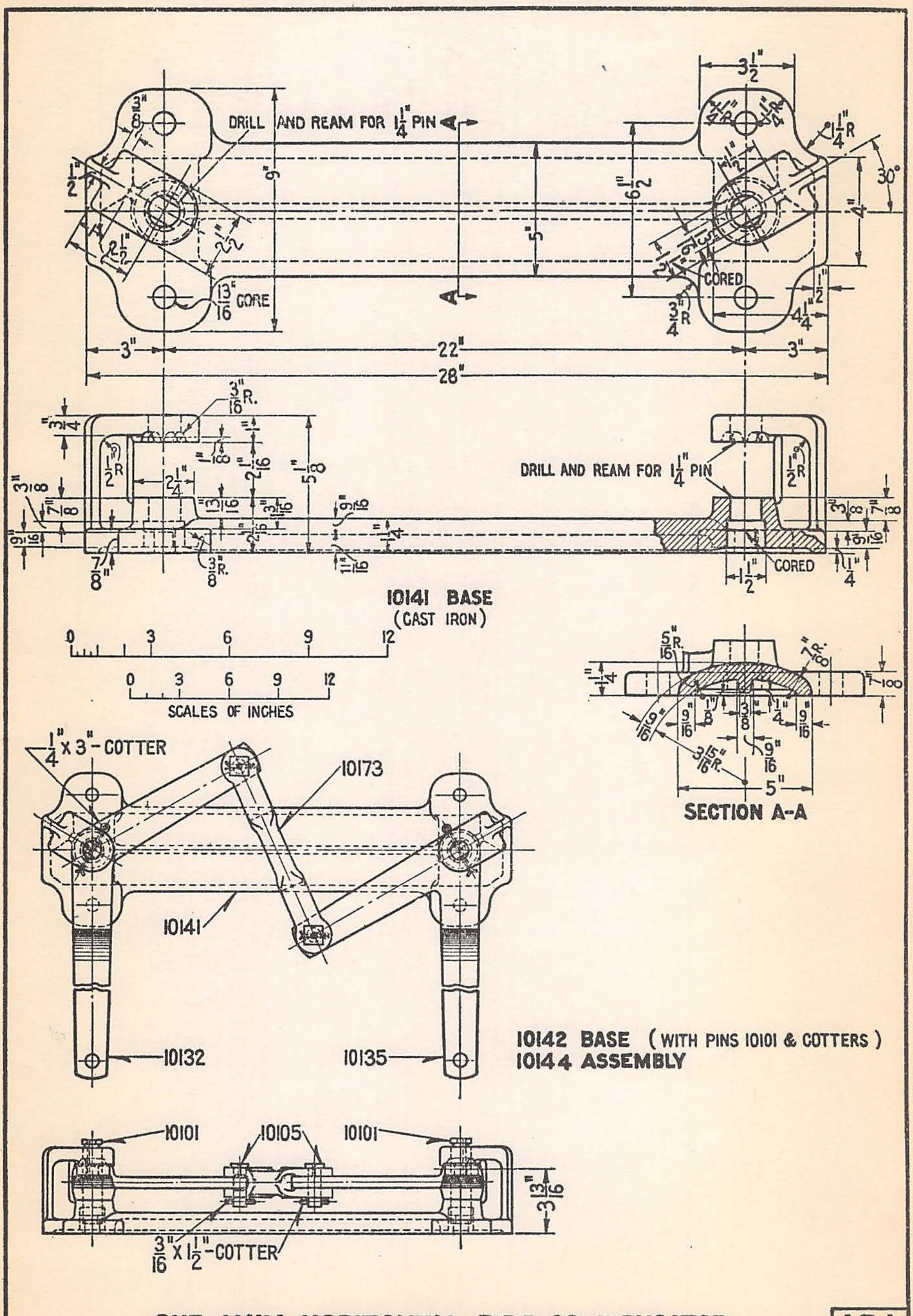
10135 ACUTE ANGLE CRANK
(FORGED STEEL)

NOTE: MATERIAL SHALL BE IN ACCORDANCE WITH A.R.A. SIG. SEC. SPECIFICATION.


0
3
6
9
12
SCALE OF INCHES

PIPE COMPENSATOR CRANKS
(DETAILS)

							M-1927	MAR.1927	MANUAL-NOV.1913	DEC.1908	ARA SIG.SEC. 1013B


DRILL AND REAM FOR 1¼" PIN
A
13/16" CORE
CORED
3½"
30°
22"
28"
3"
DRILL AND REAM FOR 1¼" PIN
CORED
10141 BASE
(CAST IRON)
0 3 6 9 12
SCALES OF INCHES
SECTION A-A
5"
¼" x 3"-COTTER
10173
10141
10132
10135
10142 BASE (WITH PINS 10101 & COTTERS)
10144 ASSEMBLY
10101
10105
10101
3/16" x 1½"-COTTER
3 13/16"

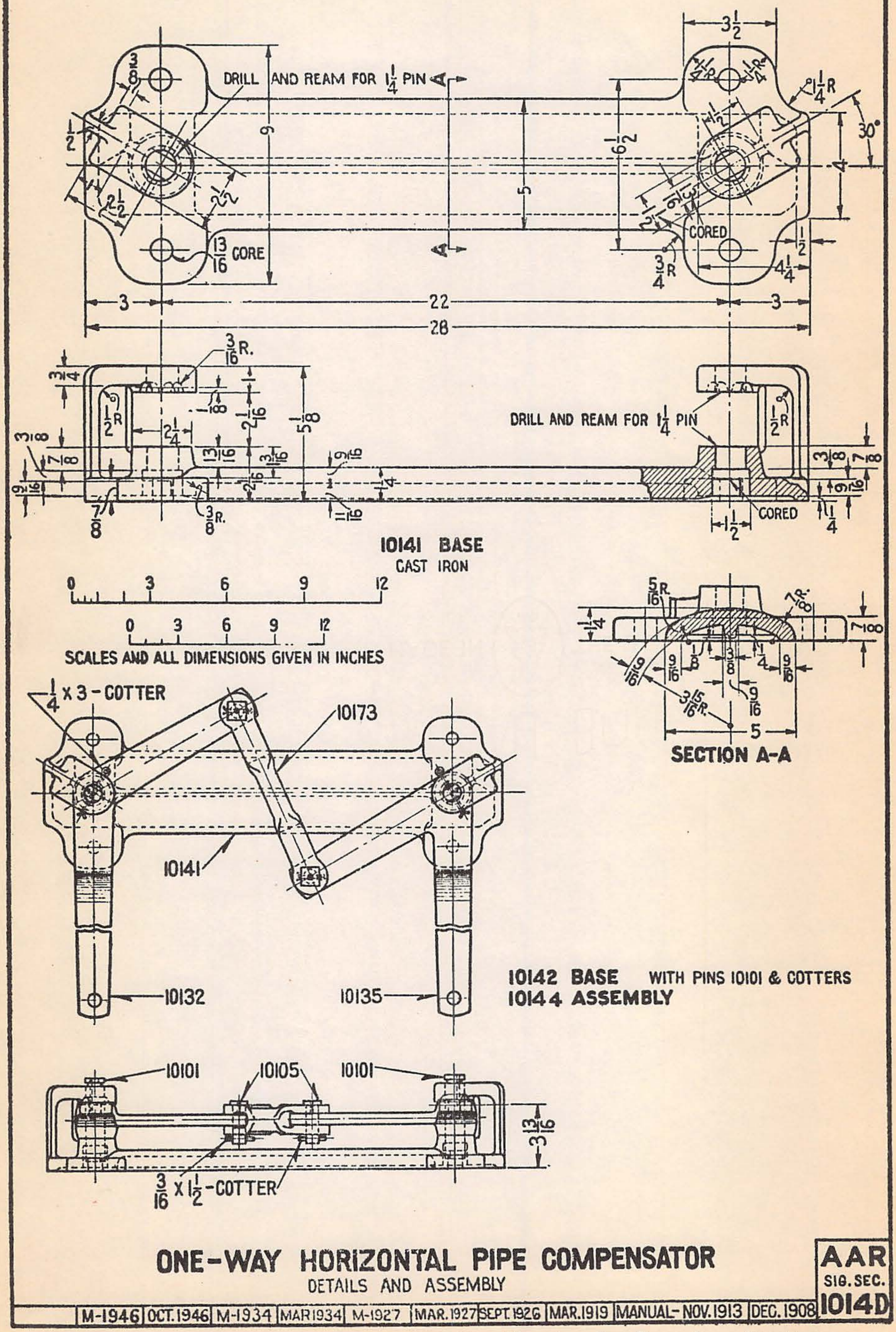
ONE-WAY HORIZONTAL PIPE COMPENSATOR

(DETAILS AND ASSEMBLY)

ARA
SIG. SEC.
1014C

M-1934 | MAR 1934 | M-1927 | MAR. 1927 | SEPT. 1926 | MAR. 1919 | MANUAL-NOV. 1913 | DEC. 1908

Cast iron shall be in accordance with Specification for Gray Iron Castings.


DRILL AND REAM FOR 1¼ PIN
A
13/16 CORE
CORED
30°
3/4 R
22
28
DRILL AND REAM FOR 1¼ PIN
CORED
10141 BASE
CAST IRON
0 3 6 9 12
0 3 6 9 12
SCALES AND ALL DIMENSIONS GIVEN IN INCHES
SECTION A-A
¼ X 3 - COTTER
10173
10141
10132
10135
10142 BASE WITH PINS 10101 & COTTERS
10144 ASSEMBLY
10101
10105
10101
3/16 X 1½ - COTTER
3 13/16

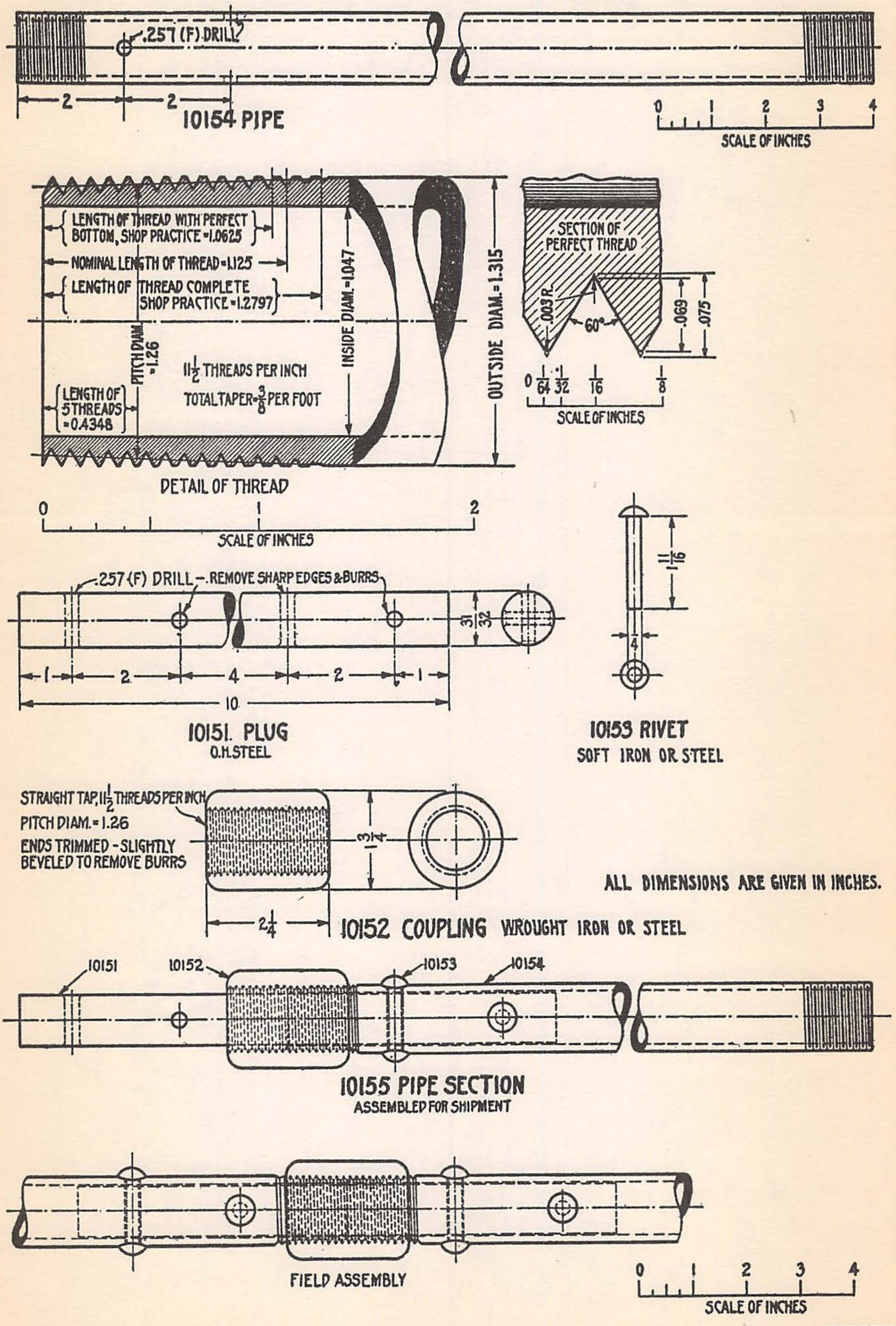
ONE-WAY HORIZONTAL PIPE COMPENSATOR

DETAILS AND ASSEMBLY

M-1946	OCT. 1946	M-1934	MAR 1934	M-1927	MAR. 1927	SEPT. 1926	MAR. 1919	MANUAL- NOV. 1913	DEC. 1908	AAR SIG. SEC. 1014D

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

FEB
12
1948
SPECIFICATION DEPT.

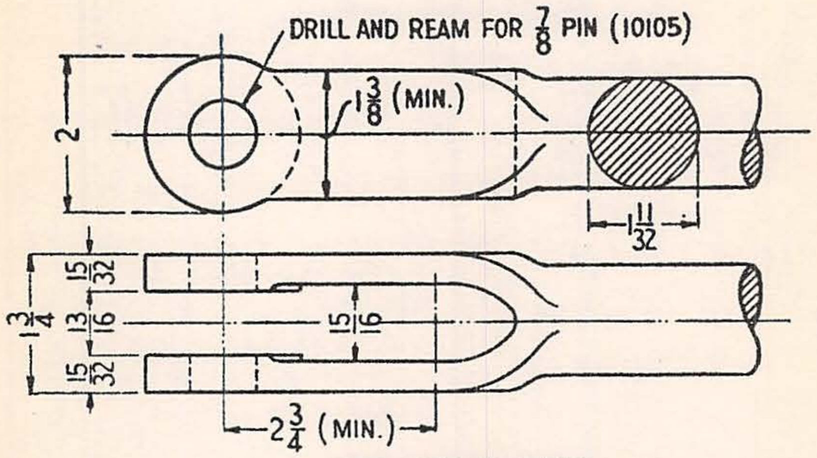

.257 (F) DRILL
2
2
10154 PIPE
0 1 2 3 4
SCALE OF INCHES
LENGTH OF THREAD WITH PERFECT BOTTOM, SHOP PRACTICE = 1.0625
NOMINAL LENGTH OF THREAD = 1.125
LENGTH OF THREAD COMPLETE SHOP PRACTICE = 1.2797
PITCH DIAM. = 1.26
11½ THREADS PER INCH
TOTAL TAPER = 3/8 PER FOOT
LENGTH OF 5 THREADS = 0.4348
INSIDE DIAM. = 1.047
OUTSIDE DIAM. = 1.315
DETAIL OF THREAD
0 1 2
SCALE OF INCHES
SECTION OF PERFECT THREAD
.003 R.
60°
.069
.075
0 1/64 1/32 1/16 1/8
SCALE OF INCHES
.257 (F) DRILL — REMOVE SHARP EDGES & BURRS
31/32
1
2
4
2
1
10
10151 PLUG
O.H. STEEL
1 1/16
1/4
10153 RIVET
SOFT IRON OR STEEL
STRAIGHT TAP, 11½ THREADS PER INCH
PITCH DIAM. = 1.26
ENDS TRIMMED - SLIGHTLY BEVELED TO REMOVE BURRS
1 3/4
2 1/4
10152 COUPLING WROUGHT IRON OR STEEL
ALL DIMENSIONS ARE GIVEN IN INCHES.
10151
10152
10153
10154
10155 PIPE SECTION
ASSEMBLED FOR SHIPMENT
FIELD ASSEMBLY
0 1 2 3 4
SCALE OF INCHES

ONE-INCH SIGNAL PIPE AND COUPLING

ARA
SIG. SEC.
1015A

MAN'L 1923 | MARCH 1922 | JULY 1920 | DEC. 1919 | MARCH 1919 | MARCH 1915 | DEC. 1910 | DEC. 1908

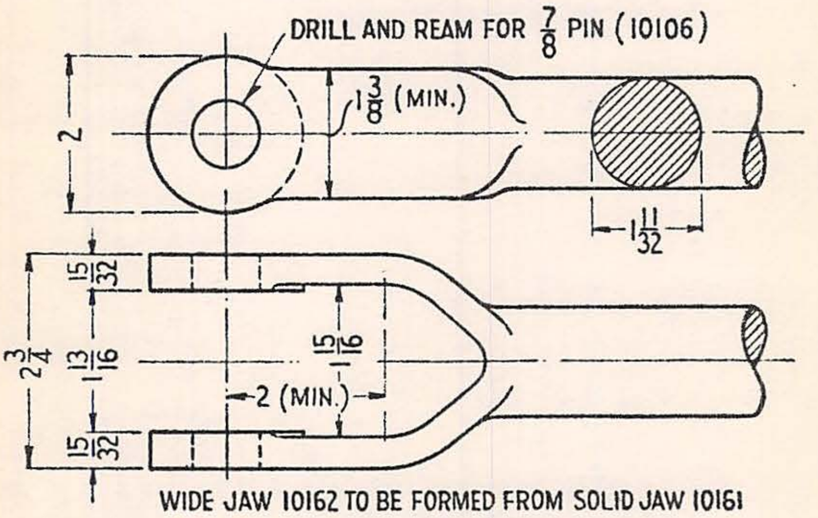
Material shall be in accordance with Specifications 122 and 123.



DRILL AND REAM FOR 7/8 PIN (10105)
2
1 3/8 (MIN.)
1 11/32
15/32
1 3/4
13/16
15/16
15/32
2 3/4 (MIN.)

10161 SOLID JAW

SAE-1020 STEEL FORGED

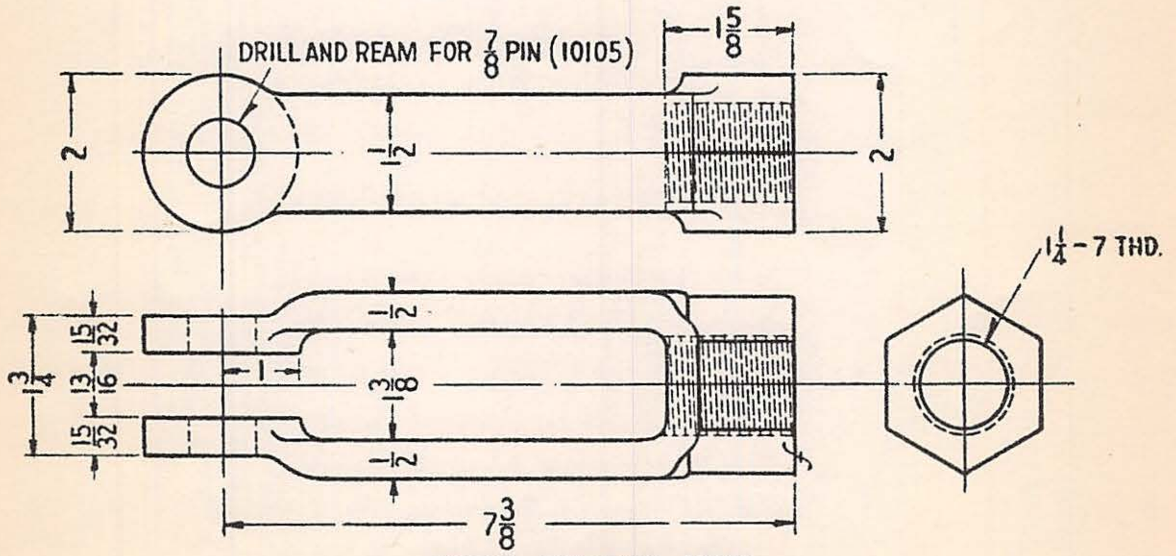


DRILL AND REAM FOR 7/8 PIN (10106)
2
1 3/8 (MIN.)
1 11/32
15/32
2 3/4
1 13/16
1 15/16
2 (MIN.)
15/32

WIDE JAW 10162 TO BE FORMED FROM SOLID JAW 10161

10162 WIDE JAW

SAE-1020 STEEL FORGED



DRILL AND REAM FOR 7/8 PIN (10105)
1 5/8
2
1 1/2
2
1 1/4 - 7 THD.
1 3/4
15/32
13/16
15/32
1/2
1
1 3/8
1/2
7 3/8

10164 SCREW JAW

SAE-1020 STEEL FORGED

0 1 2 3 6

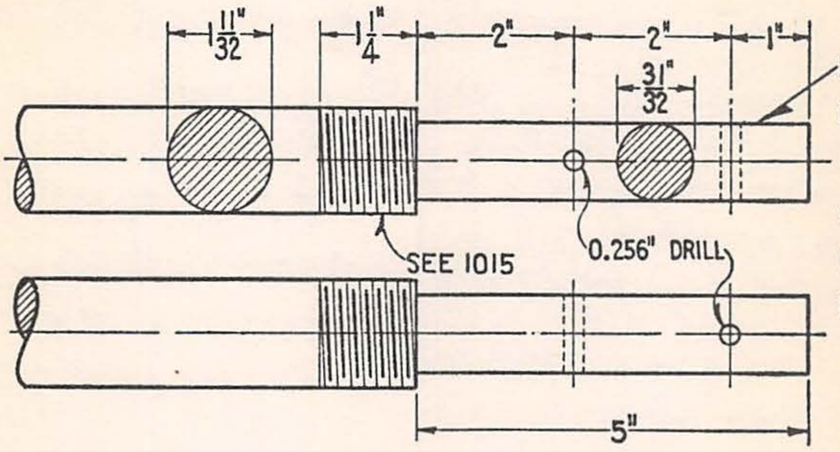
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

SCREW AND SOLID JAWS

(DETAILS)

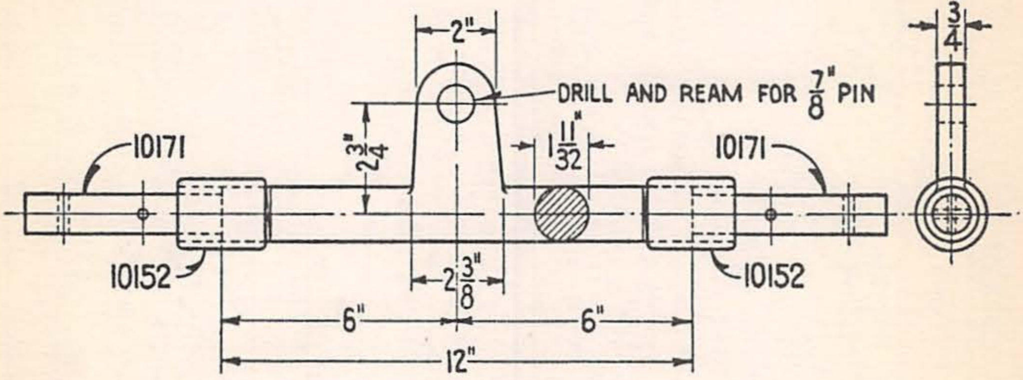
				M-1940	OCT. 1940	M-1934	MAR. 1934	SEP. 1916	MANUAL-NOV. 1913	DEC. 1908

AAR
SIG. SEC.
1016C

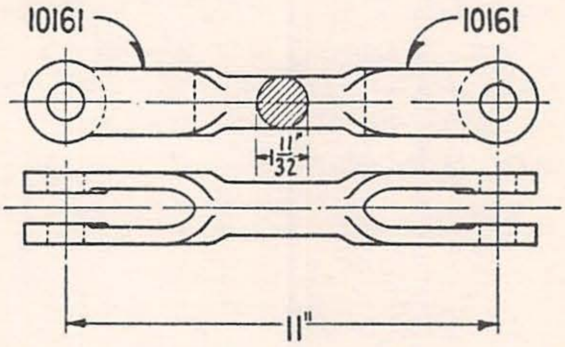

1 11/32"
1 1/4"
2"
2"
1"
31/32"
SEE 1015
0.256" DRILL
5"

NOTE: NOMINAL DIAMETER OF TANG END SHALL BE $\frac{31}{32}$". ALLOWABLE VARIATION
MINIMUM $\frac{15}{16}$"
MAXIMUM $\frac{63}{64}$"

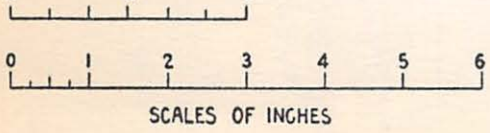
10171 DETAIL OF TANG END (FOR 1" SIGNAL PIPE)
(O. H. STEEL)


2"
DRILL AND REAM FOR 7/8" PIN
3/4"
10171
2 3/4"
1 11/32"
10171
10152
2 3/8"
10152
6"
6"
12"

10172 LUG
(O H STEEL)


10161
10161
1 11/32"
11"

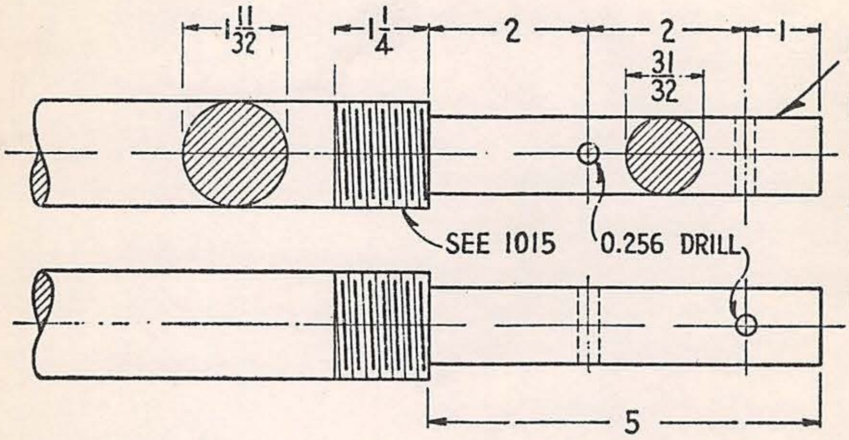
10173 COMPENSATOR LINK
(O. H. STEEL)


0
3
6
0
1
2
3
4
5
6
SCALES OF INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

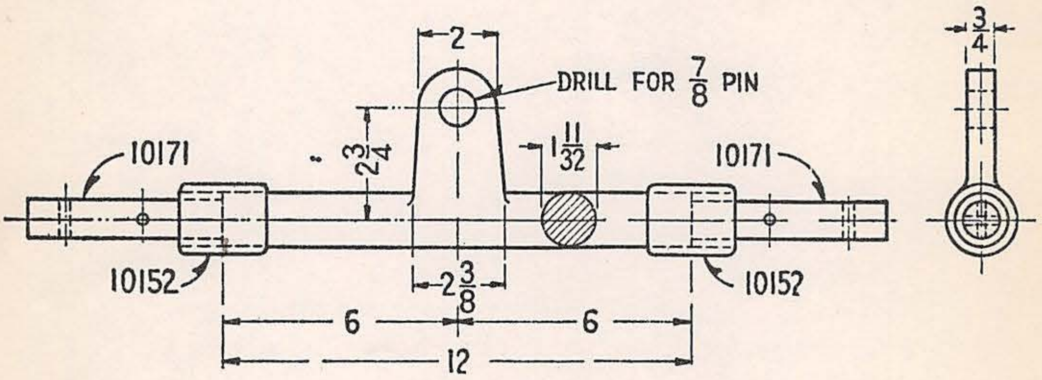
TANG END - LUG AND COMP. LINK
(DETAILS AND ASSEMBLY)

					M-1934	MAR1934	SEP. 1916	MANUAL- NOV. 1913	DEC. 1908	ARA SIG. SEC. 1017B

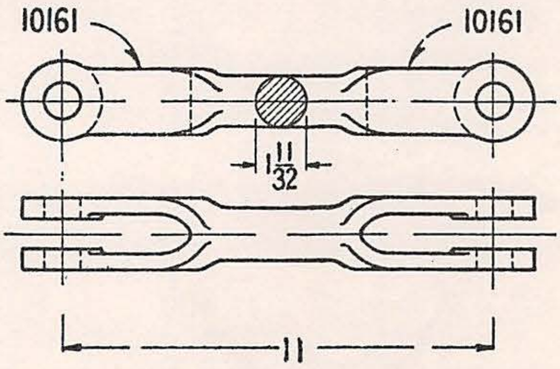

$1\frac{11}{32}$
$1\frac{1}{4}$
2
2
1
$\frac{31}{32}$
SEE 1015
0.256 DRILL
5

NOTE: NOMINAL DIAMETER OF TANG END SHALL BE $\frac{31}{32}$
ALLOWABLE VARIATION
MINIMUM $\frac{15}{16}$
MAXIMUM $\frac{63}{64}$

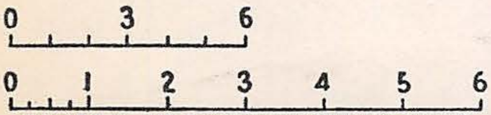
10171 DETAIL OF TANG END FOR 1 IN. SIGNAL PIPE
SAE – 1020 STEEL


2
DRILL FOR $\frac{7}{8}$ PIN
$\frac{3}{4}$
10171
$2\frac{3}{4}$
$1\frac{11}{32}$
10171
10152
$2\frac{3}{8}$
10152
6
6
12

10172 LUG
SAE – 1020 STEEL


10161
10161
$1\frac{11}{32}$
11

10173 COMPENSATOR LINK
SAE – 1020 STEEL

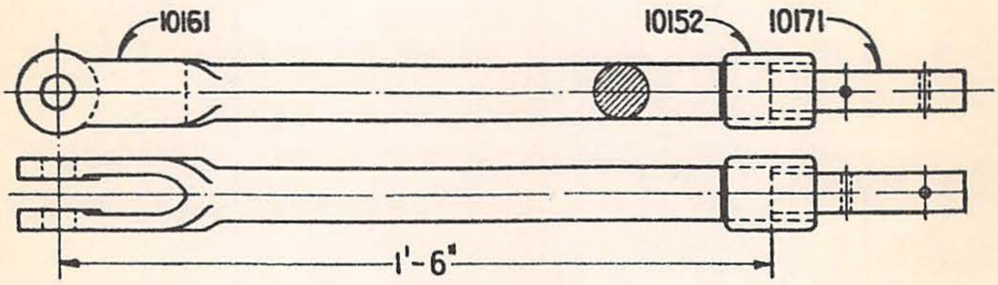

0
3
6
0
1
2
3
4
5
6

SCALES & ALL DIMENSIONS GIVEN IN INCHES

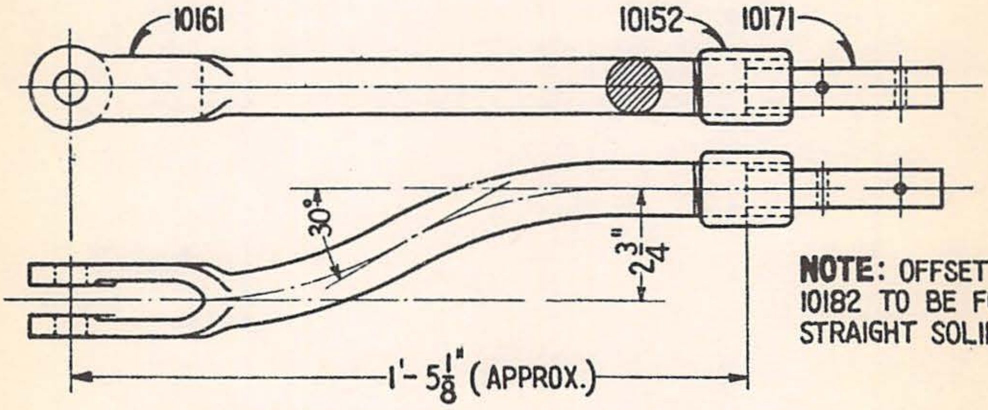
TANG END – LUG AND COMP. LINK
(DETAILS AND ASSEMBLY)

				M-1942	OCT. 1942	M-1934	MAR. 1934	SEP. 1916	MANUAL-NOV 1913	DEC. 1908

AAR
SIG. SEC.
1017C

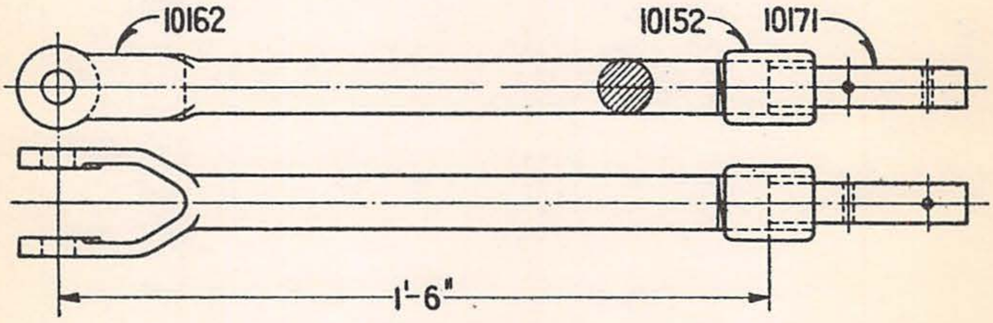

10161
10152
10171
1'-6"

10181 STRAIGHT SOLID JAW (TANG END)

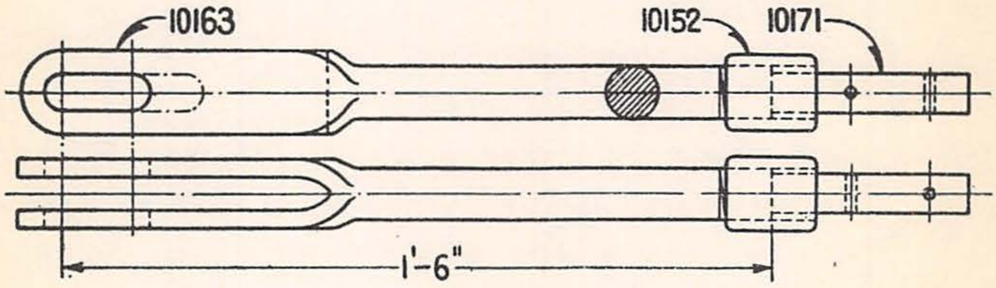

10161
10152
10171
30°
2 3/4"
1'-5 1/8" (APPROX.)

NOTE: OFFSET SOLID JAW 10182 TO BE FORMED FROM STRAIGHT SOLID JAW 10181.

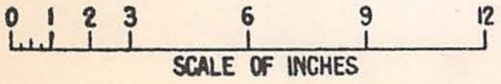
10182 OFFSET SOLID JAW (TANG END)


10162
10152
10171
1'-6"

10183 WIDE JAW (TANG END)


10163
10152
10171
1'-6"

10184 SLOTTED JAW (TANG END)

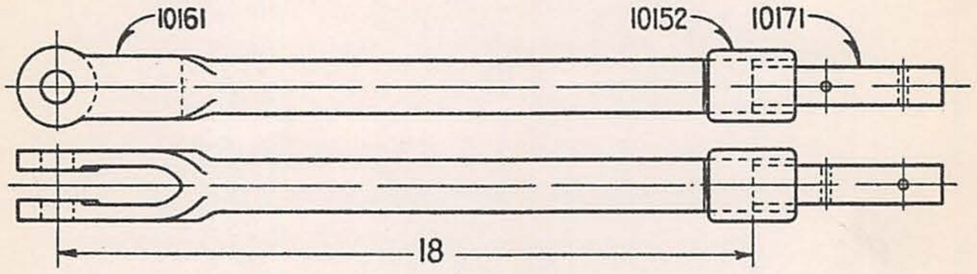

0 1 2 3 6 9 12
SCALE OF INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

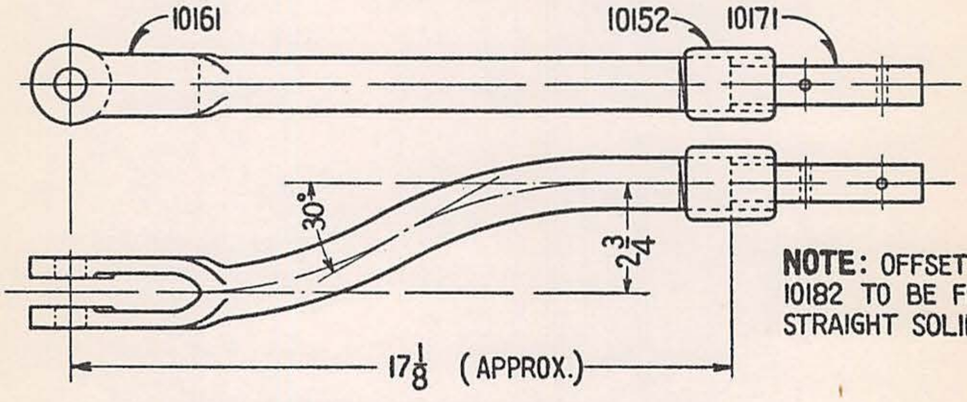
SOLID JAWS WITH TANG ENDS
(ASSEMBLY)

MANUAL- NOV. 1913 DEC. 1908

RSA 1018

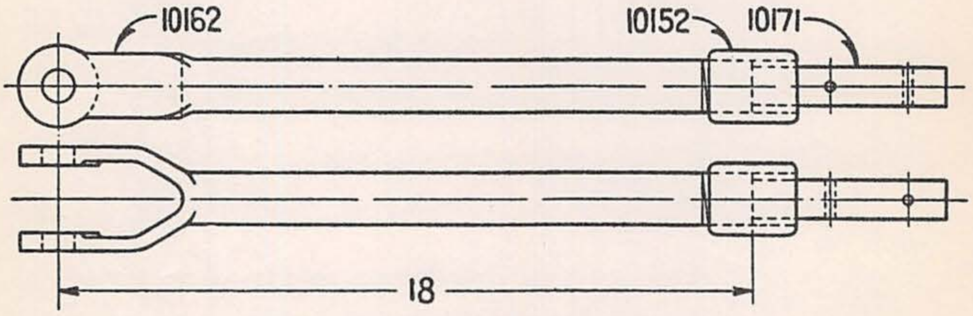

10161
10152
10171
18

10181 STRAIGHT SOLID JAW (TANG END)

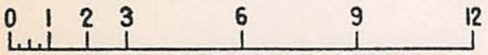

10161
10152
10171
30°
$2\frac{3}{4}$
$17\frac{1}{8}$ (APPROX.)

NOTE: OFFSET SOLID JAW 10182 TO BE FORMED FROM STRAIGHT SOLID JAW 10181.

10182 OFFSET SOLID JAW (TANG END)


10162
10152
10171
18

10183 WIDE JAW (TANG END)



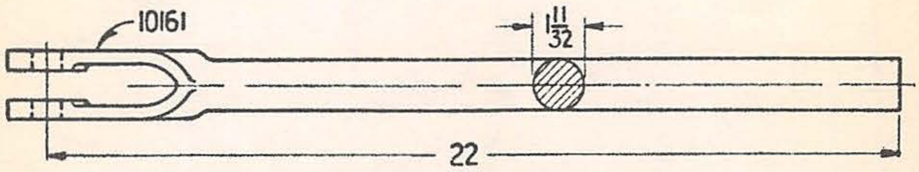
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

SOLID JAWS WITH TANG ENDS

(ASSEMBLY)

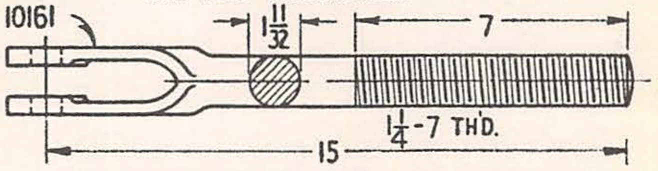
M-1941 | SEP. 1941 | MANUAL-NOV. 1913 | DEC. 1908

AAR
SIG. SEC.
1018B



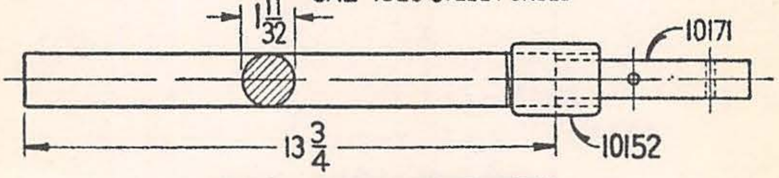
10161
$1\frac{11}{32}$
22

10191 SOLID JAW (PLAIN END)
SAE-1020 STEEL FORGED



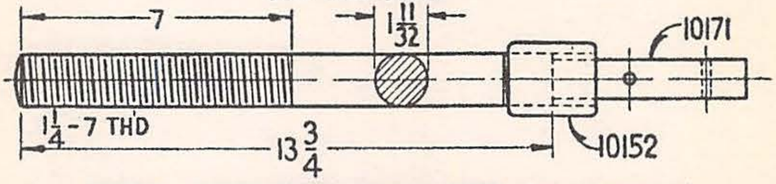
10161
$1\frac{11}{32}$
7
$1\frac{1}{4}$-7 TH'D.
15

10192 SOLID JAW (THREADED END)
SAE-1020 STEEL FORGED



$1\frac{11}{32}$
10171
$13\frac{3}{4}$
10152

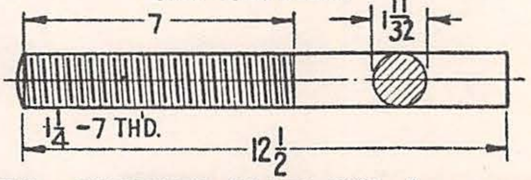
10193 PLAIN TANG END
SAE-1020 STEEL



7
$1\frac{11}{32}$
10171
$1\frac{1}{4}$-7 TH'D
$13\frac{3}{4}$
10152

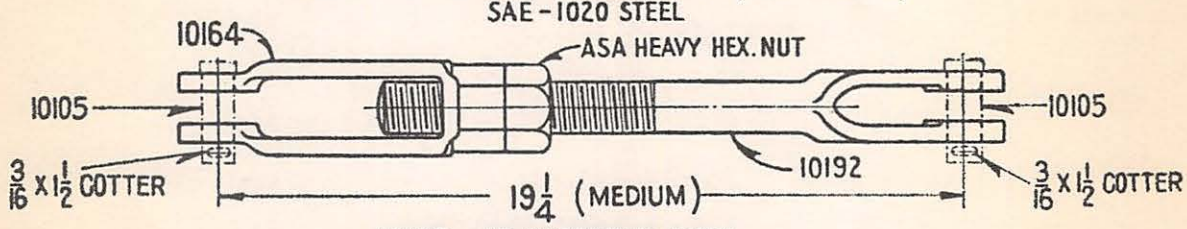
10194 THREADED TANG END (R.H. THREAD)
10195 THREADED TANG END (L.H. THREAD)
SAE-1020 STEEL

0 1 2 3 6 9
SCALE AND ALL DIMENSIONS GIVEN IN INCHES



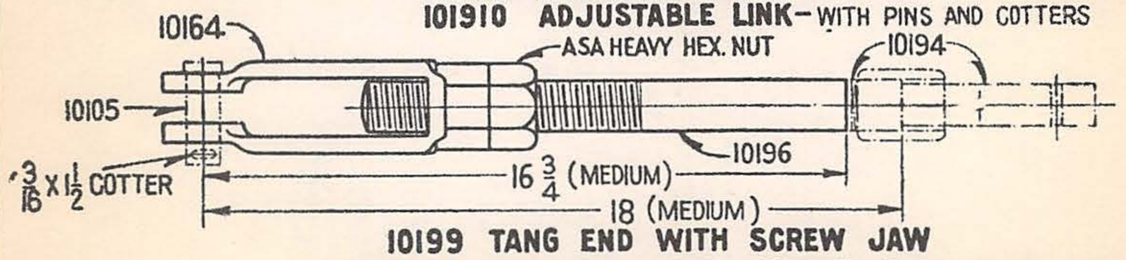
7
$1\frac{11}{32}$
$1\frac{1}{4}$-7 TH'D.
$12\frac{1}{2}$

10196 THREADED PLAIN END (R.H. THREAD)
10197 THREADED PLAIN END (L.H. THREAD)
SAE-1020 STEEL



10164
ASA HEAVY HEX. NUT
10105
10105
$\frac{3}{16}$ X $1\frac{1}{2}$ COTTER
10192
$\frac{3}{16}$ X $1\frac{1}{2}$ COTTER
$19\frac{1}{4}$ (MEDIUM)

10198 ADJUSTABLE LINK
101910 ADJUSTABLE LINK-WITH PINS AND COTTERS



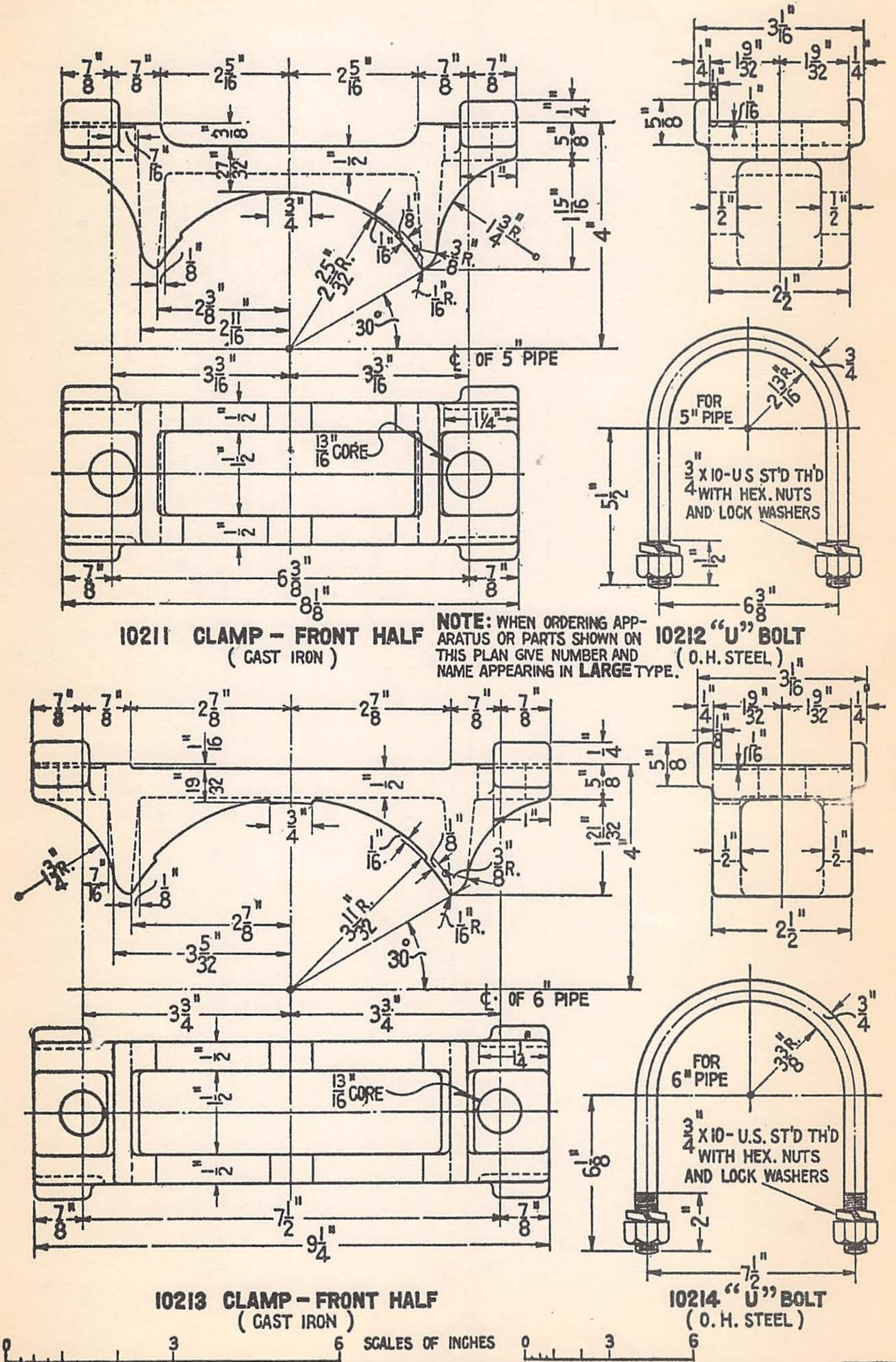
10164
ASA HEAVY HEX. NUT
10194
10105
10196
$\frac{3}{16}$ X $1\frac{1}{2}$ COTTER
$16\frac{3}{4}$ (MEDIUM)
18 (MEDIUM)

10199 TANG END WITH SCREW JAW
101911 TANG END WITH SCREW JAW-PIN AND COTTER
101912 THREADED PLAIN END WITH SCREW JAW
101913 THREADED PLAIN END WITH SCREW JAW-PIN AND COTTER

JAWS-TANG END AND ADJUSTABLE LINK
(DETAILS AND ASSEMBLY)

		M-1940	OCT. 1940	M 1934	MAR1934	DEC. 1916	SEP. 1916	MANUAL-FEB. 1914	DEC. 1908

AAR
SIG. SEC.
1019 C



℄ OF 5" PIPE
13/16" CORE
FOR 5" PIPE
3/4" X 10-U S ST'D TH'D WITH HEX. NUTS AND LOCK WASHERS
℄ OF 6" PIPE
13/16" CORE
FOR 6" PIPE
3/4" X 10-U.S. ST'D TH'D WITH HEX. NUTS AND LOCK WASHERS
0 3 6 SCALES OF INCHES 0 3 6

10211 CLAMP – FRONT HALF
(CAST IRON)

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

10212 "U" BOLT
(O.H. STEEL)

10213 CLAMP – FRONT HALF
(CAST IRON)

10214 "U" BOLT
(O.H. STEEL)

GUIDE CLAMPS FOR VERTICAL CONNECTIONS ON SIGNALS
(DETAILS)

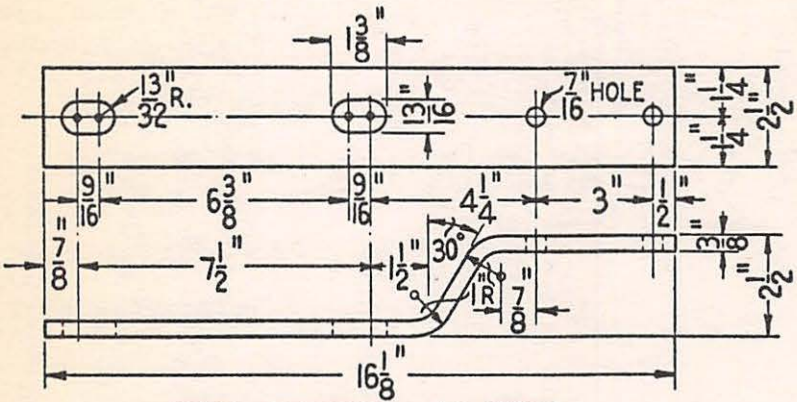
RSA
1021

JUN.1917 MAR.1915

See 1022 and 1023.
Cast iron shall be in accordance with Specification for Gray Iron Castings.

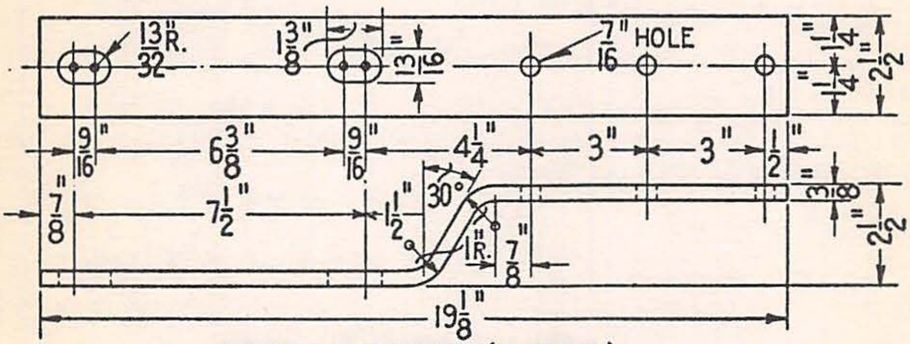
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

0 3 6 9
SCALE OF INCHES



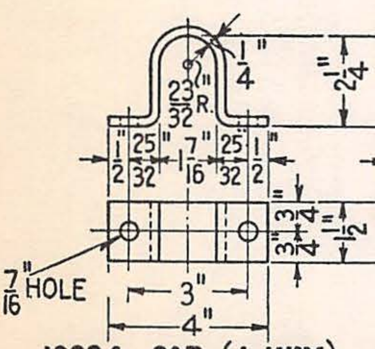
1 3/8"
13/32" R.
13/16"
7/16" HOLE
1/4"
1/4"
2 1/2"
9/16"
6 3/8"
9/16"
4 1/4"
3"
1/2"
3/8"
7/8"
7 1/2"
1 1/2"
30°
1" R.
7/8
2 1/2"
16 1/8"

10221 SUPPORT – (1-WAY)
(O. H. STEEL)



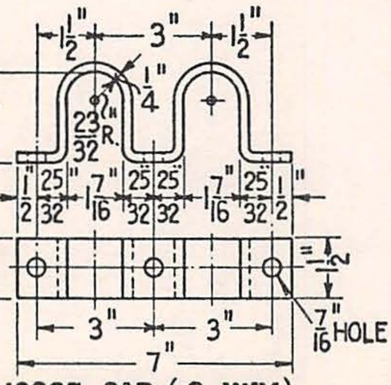
13/32" R.
1 3/8"
13/16"
7/16" HOLE
1/4"
1/4"
2 1/2"
9/16"
6 3/8"
9/16"
4 1/4"
3"
3"
1/2"
3/8"
7/8"
7 1/2"
1 1/2"
30°
1" R.
7/8
2 1/2"
19 1/8"

10222 SUPPORT – (2-WAY)
(O. H. STEEL)



1/4"
23/32" R.
2 1/4"
1/2"
25/32"
1 7/16"
25/32
1/2"
3/4"
3/4"
1 1/2"
7/16" HOLE
3"
4"

10224 CAP-(1-WAY)



1 1/2"
3"
1 1/2"
1/4"
23/32" R.
1/2"
25/32"
1 7/16"
25/32
25/32
1 7/16"
25/32
1/2"
1 1/2"
7/16" HOLE
3"
3"
7"

10225 CAP-(2-WAY)
(O. H. STEEL)

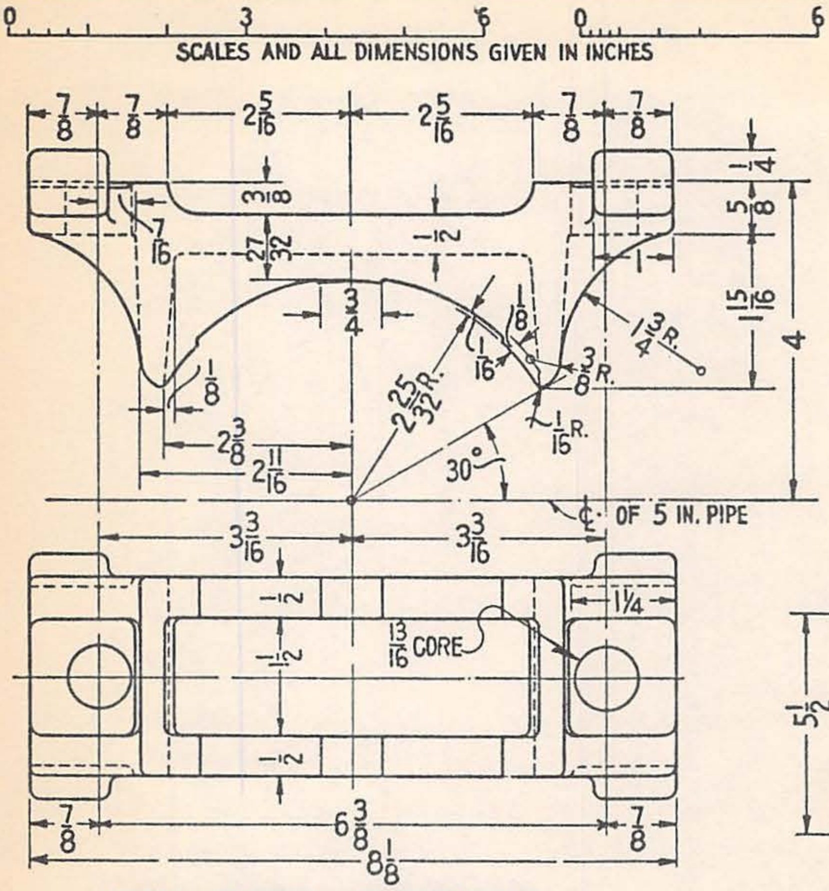
GUIDE SUPPORTS AND CAPS FOR VERTICAL CONNECTIONS ON SIGNALS
(DETAILS)

A A R
SIG. SEC.
1022B

M-1935 | MAR1935 | MAR.1915

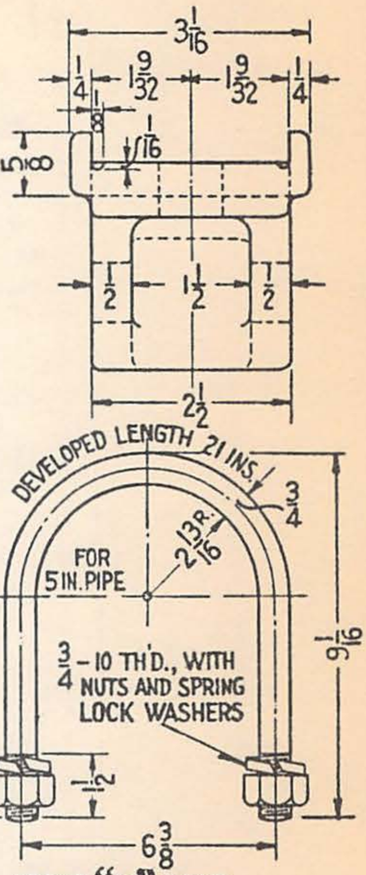
See 1021 and 1023.

SCALES AND ALL DIMENSIONS GIVEN IN INCHES



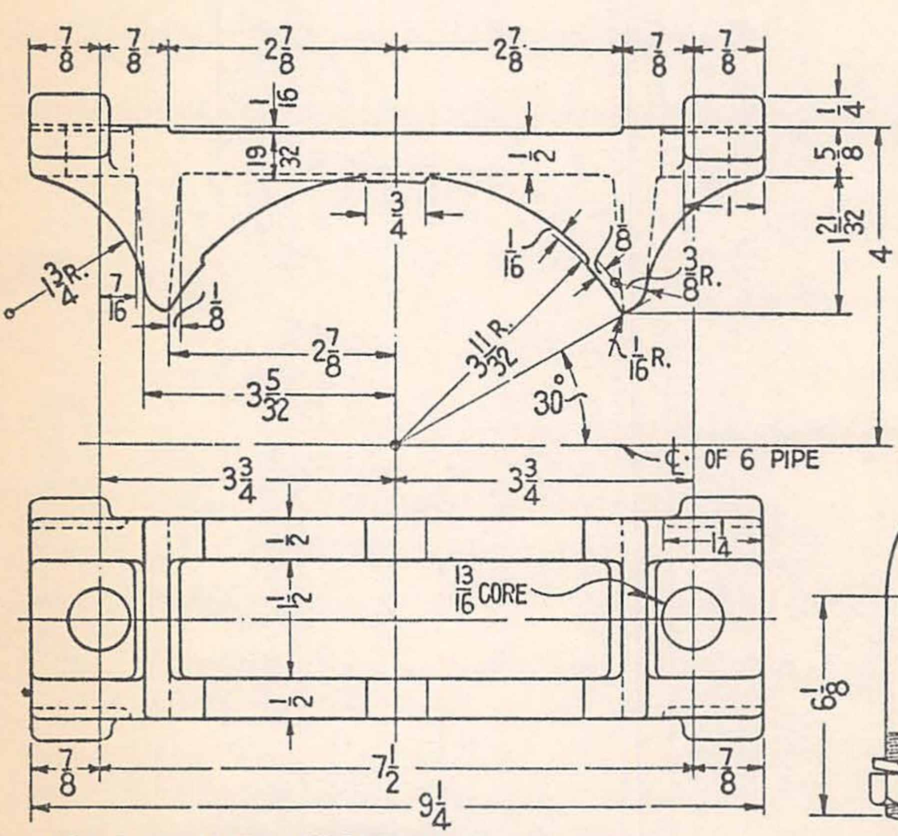
0
3
6
0
6
7/8
7/8
2 5/16
2 5/16
7/8
7/8
1/4
5/8
15/16
4
3/8
1/2
7/16
27/32
3/4
1/8
1 3/4 R.
3/8 R.
1/16
1/8
2 25/32 R.
1/16 R.
1/8
2 3/8
2 11/16
30°
℄ OF 5 IN. PIPE
3 3/16
3 3/16
1/2
1 1/2
13/16 CORE
1 1/4
7/8
6 3/8
7/8
8 1/8

10211 CLAMP – FRONT HALF
CAST IRON



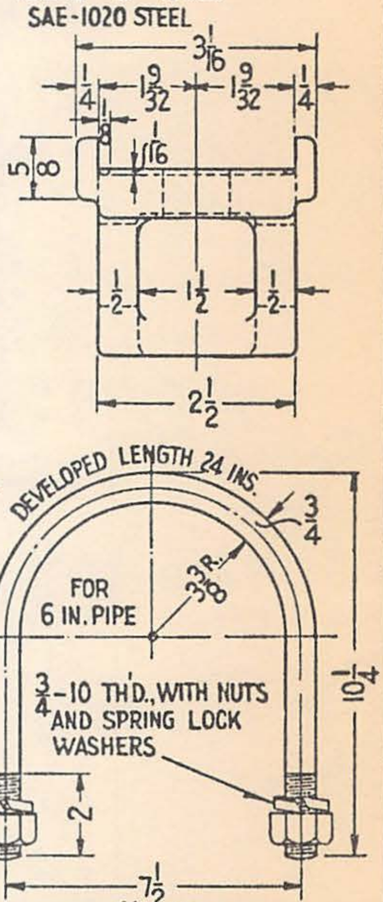
3 1/16
1/4
1 9/32
1 9/32
1/4
1/8
1/16
5/8
1/2
1 1/2
1/2
2 1/2
DEVELOPED LENGTH 21 INS.
3/4
2 13/16 R.
FOR 5 IN. PIPE
3/4 - 10 TH'D., WITH NUTS AND SPRING LOCK WASHERS
5 1/2
1/2
9 1/16
6 3/8

10212 "U" BOLT
SAE-1020 STEEL



7/8
7/8
2 7/8
2 7/8
7/8
7/8
1/16
19/32
1/2
1/4
5/8
1
1 21/32
4
3/4
1/16
1/8
3/8 R.
1 3/4 R.
7/16
1/8
3 11/32 R.
1/16 R.
2 7/8
3 5/32
30°
℄ OF 6 PIPE
3 3/4
3 3/4
1/2
1 1/2
13/16 CORE
1 1/4
1/2
7/8
7 1/2
7/8
9 1/4

10213 CLAMP – FRONT HALF, CAST IRON



3 1/16
1/4
1 9/32
1 9/32
1/4
1/8
1/16
5/8
1/2
1 1/2
1/2
2 1/2
DEVELOPED LENGTH 24 INS.
3/4
3 3/8 R.
FOR 6 IN. PIPE
3/4-10 TH'D., WITH NUTS AND SPRING LOCK WASHERS
6 1/8
2
10 1/4
7 1/2

10214 "U" BOLT
SAE-1020 STEEL

NOTE: BOLTS SHALL BE PAINTED WITH PRIMING COAT OR GALVANIZED OR CADMIUM PLATED. NUTS SHALL BE GALVANIZED OR CADMIUM PLATED. GALVANIZING OR CADMIUM PLATING SHALL BE DONE AFTER THREADS HAVE BEEN CUT AND BOLTS FORMED.

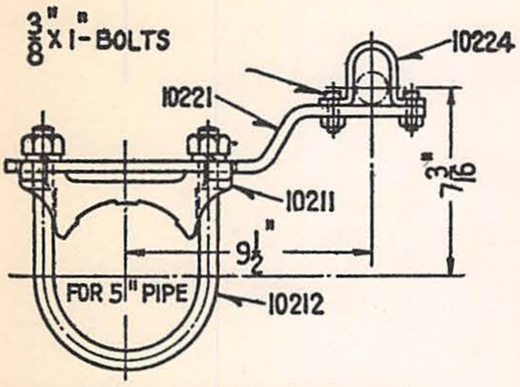
GUIDE CLAMPS FOR VERTICAL CONNECTIONS ON SIGNALS
DETAILS

						M-1947	SEP. 1947	M-1945	OCT. 1945	JUN. 1917	MAR. 1915

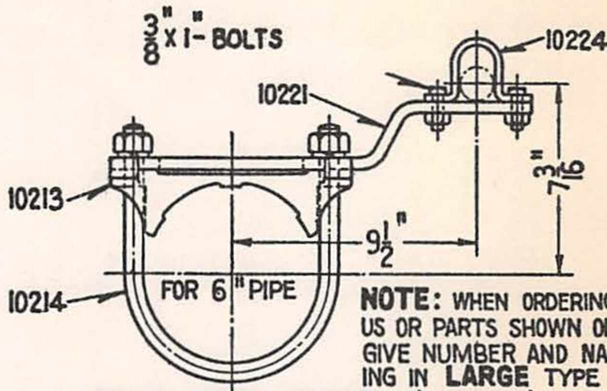
AAR
SIG. SEC.
1021C

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17; Painting shall be in accordance with Specification 120, Manual Part 110; Spring Lock Washers shall be carbon steel. (A.S.A. current Specification B27.1 is preferred, where practicable.)

PRINTED IN U. S. A.

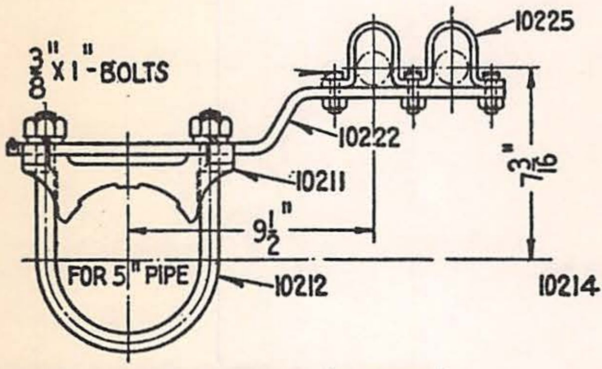

3/8" x 1" - BOLTS
10224
10221
10211
7 3/16"
9 1/2"
FOR 5" PIPE
10212

10231 GUIDE COMPL.-(1-WAY)

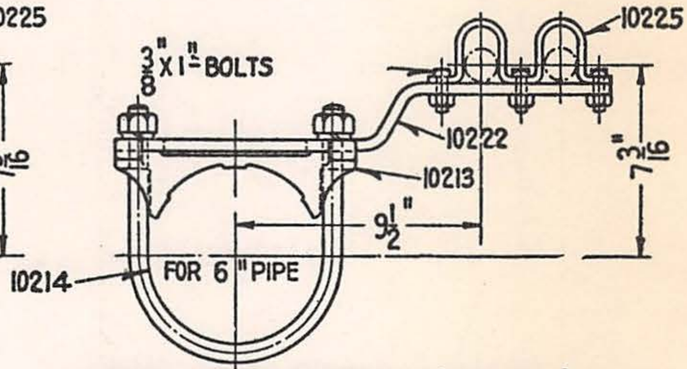

3/8" x 1" - BOLTS
10224
10221
10213
7 3/16"
9 1/2"
10214
FOR 6" PIPE

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

10232 GUIDE COMPL.-(1-WAY)


10225
3/8" x 1" - BOLTS
10222
10211
7 3/16"
9 1/2"
FOR 5" PIPE
10212

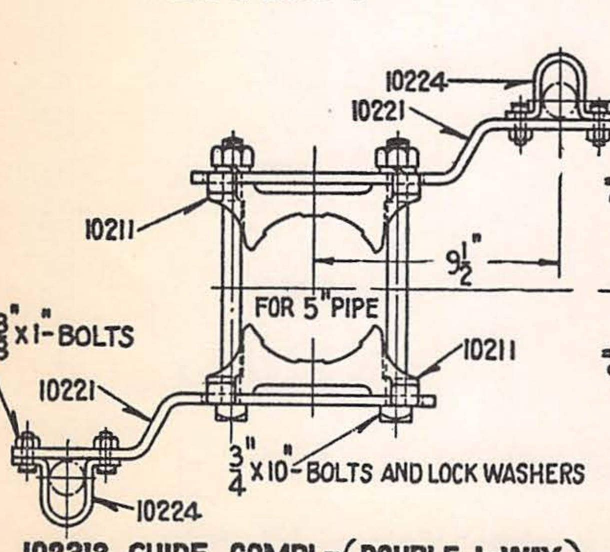
10233 GUIDE COMPL.- (2-WAY)
10234 GUIDE COMPL. (WITH 1-WAY CAP 10224)


10225
3/8" x 1" BOLTS
10222
10213
7 3/16"
9 1/2"
10214
FOR 6" PIPE

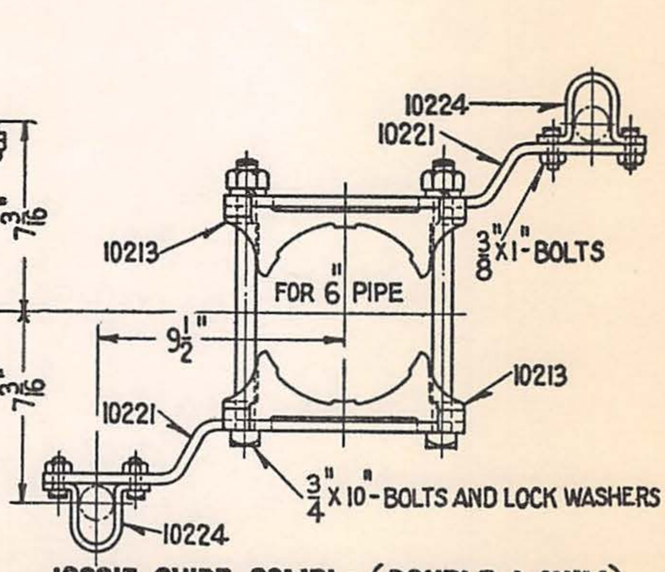
10235 GUIDE COMPL.- (2-WAY)
10236 GUIDE COMPL. (WITH 1-WAY CAP 10224)

0 3 6 9 12
SCALE OF INCHES

NOTE-BOLTS SHALL BE AMERICAN STANDARD
REGULAR SQUARE HEAD WITH HEX. NUTS.
THREAD TO BE NC-2


10224
10221
7 3/16"
10211
9 1/2"
FOR 5" PIPE
3/8" x 1" - BOLTS
10211
10221
3/4" x 10" - BOLTS AND LOCK WASHERS
10224

102313 GUIDE COMPL.-(DOUBLE 1-WAY)


10224
10221
10213
3/8" x 1" - BOLTS
FOR 6" PIPE
9 1/2"
7 3/16"
10213
10221
3/4" x 10" - BOLTS AND LOCK WASHERS
10224

102315 GUIDE COMPL.-(DOUBLE 1-WAY)

GUIDES FOR VERTICAL CONNECTIONS ON SIGNALS
(ASSEMBLY)

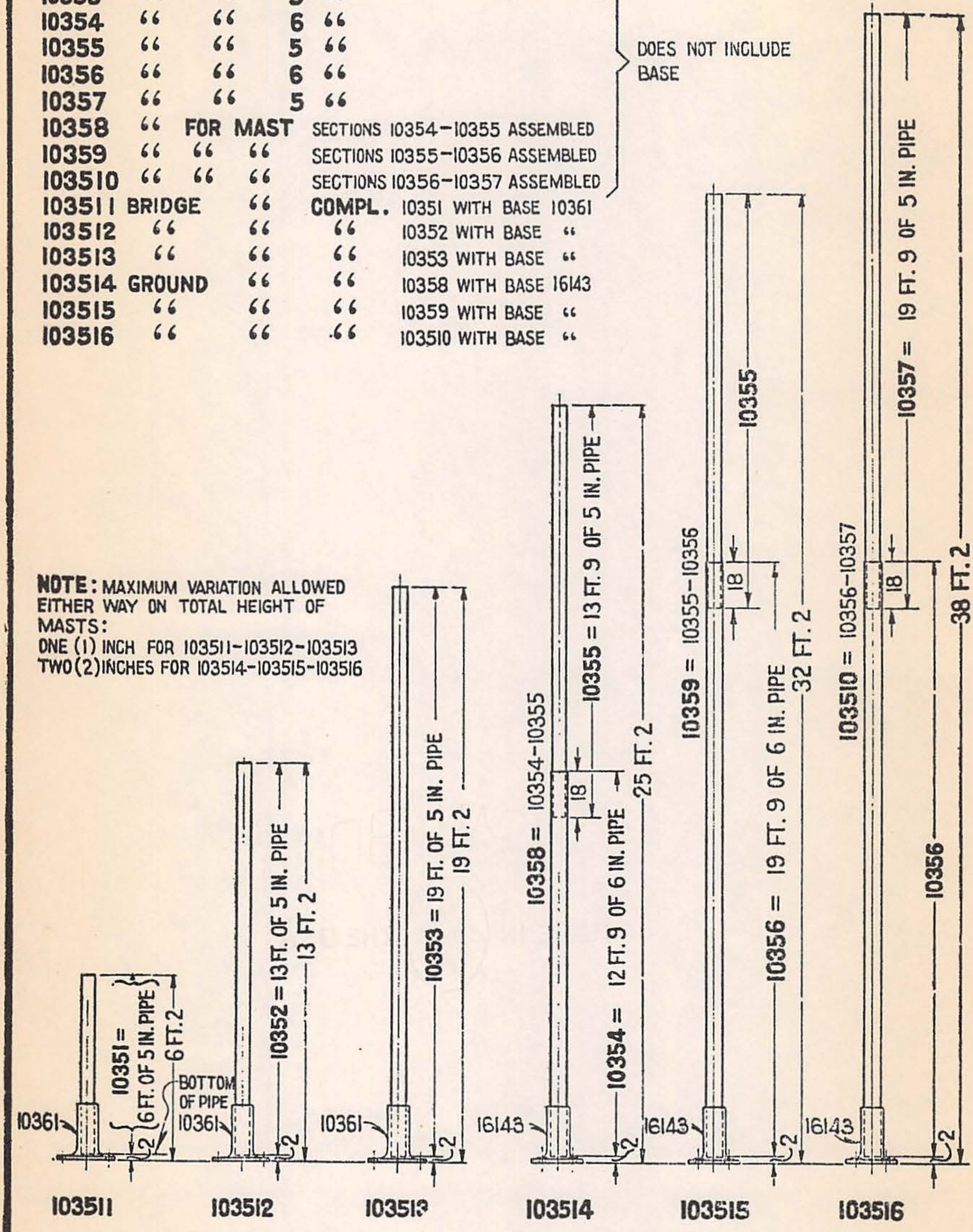
AAR
SIG SEC
1023B

M-1935 | MAR1935 | MAR.1915

See 1021 and 1022.

10351	PIPE SECTION	5 INCH	DOES NOT INCLUDE BASE
10352	" "	5 "	
10353	" "	5 "	
10354	" "	6 "	
10355	" "	5 "	
10356	" "	6 "	
10357	" "	5 "	
10358	" FOR MAST	SECTIONS 10354–10355 ASSEMBLED	
10359	" " "	SECTIONS 10355–10356 ASSEMBLED	
103510	" " "	SECTIONS 10356–10357 ASSEMBLED	
103511	BRIDGE "	COMPL. 10351 WITH BASE 10361	
103512	" "	" 10352 WITH BASE "	
103513	" "	" 10353 WITH BASE "	
103514	GROUND "	" 10358 WITH BASE 16143	
103515	" "	" 10359 WITH BASE "	
103516	" "	" 103510 WITH BASE "	

NOTE: MAXIMUM VARIATION ALLOWED EITHER WAY ON TOTAL HEIGHT OF MASTS:
ONE (1) INCH FOR 103511–103512–103513
TWO (2) INCHES FOR 103514–103515–103516



10351 = 6 FT. OF 5 IN. PIPE
6 FT. 2
BOTTOM OF PIPE
10361
2
10352 = 13 FT. OF 5 IN. PIPE
13 FT. 2
10353 = 19 FT. OF 5 IN. PIPE
19 FT. 2
16143
10358 = 10354–10355
10355 = 13 FT. 9 OF 5 IN. PIPE
10354 = 12 FT. 9 OF 6 IN. PIPE
18
25 FT. 2
10359 = 10355–10356
10355
10356 = 19 FT. 9 OF 6 IN. PIPE
32 FT. 2
103510 = 10356–10357
10357 = 19 FT. 9 OF 5 IN. PIPE
10356
38 FT. 2
103511
103512
103513
103514
103515
103516

FOR POWER SIGNALS WITH MECHANISM AT SEMAPHORE SHAFT AND FOR MECHANICAL SIGNALS

0 12 24 36 48 60 120

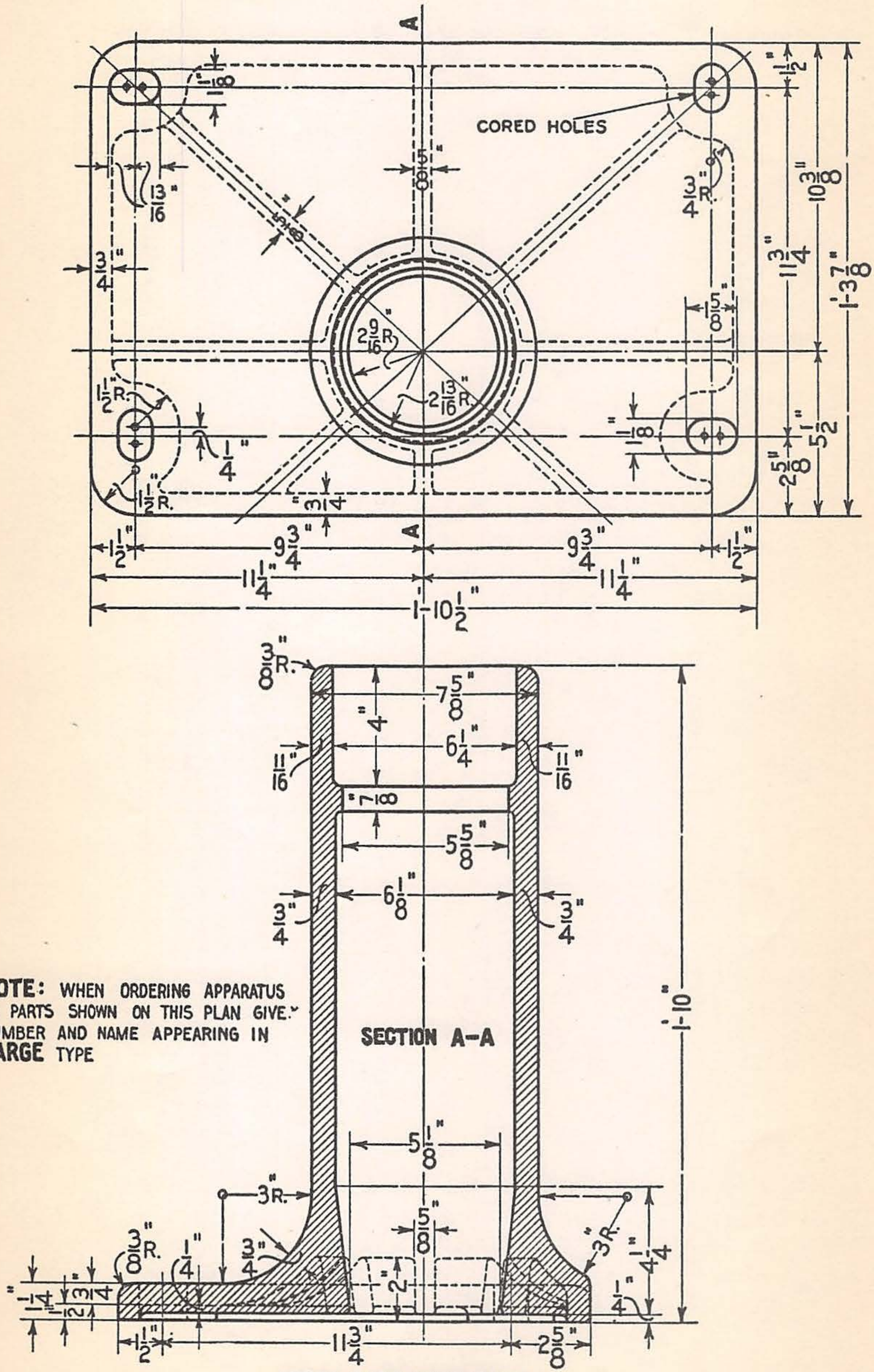
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
UNLESS OTHERWISE INDICATED

SIGNAL MASTS
DETAILS AND ASSEMBLY

M-1946 | OCT.1946 | M-1938 | APR.1938 | DEC.1915 | SEP.1914 | MAR.1910

AAR
SIG.SEC.
1035C

FEB
12
1948
INSPECTION DEPT.


A
CORED HOLES
1⅛"
1½"
13/16"
5/8"
3/4"
5/16"
3/4R.
10⅜"
11¾"
1'-3⅞"
1⅝"
2 9/16 R.
2 13/16 R.
1½"R.
1/4"
1⅛"
5½"
2⅝"
3/4"
1½"R.
1½"
9¾"
9¾"
1½"
11¼"
11¼"
1'-10½"
3/8"R.
7⅝"
4"
6¼"
11/16"
11/16"
7/8"
5⅝"
6⅛"
3/4"
3/4"
SECTION A-A
1'-10"
5⅛"
3"R.
3"R.
5/8"
3/8"R.
1/4"
3/4"
2"
1¼"
3/4"
1/2"
4¼"
1/4"
1½"
11¾"
2⅝"

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

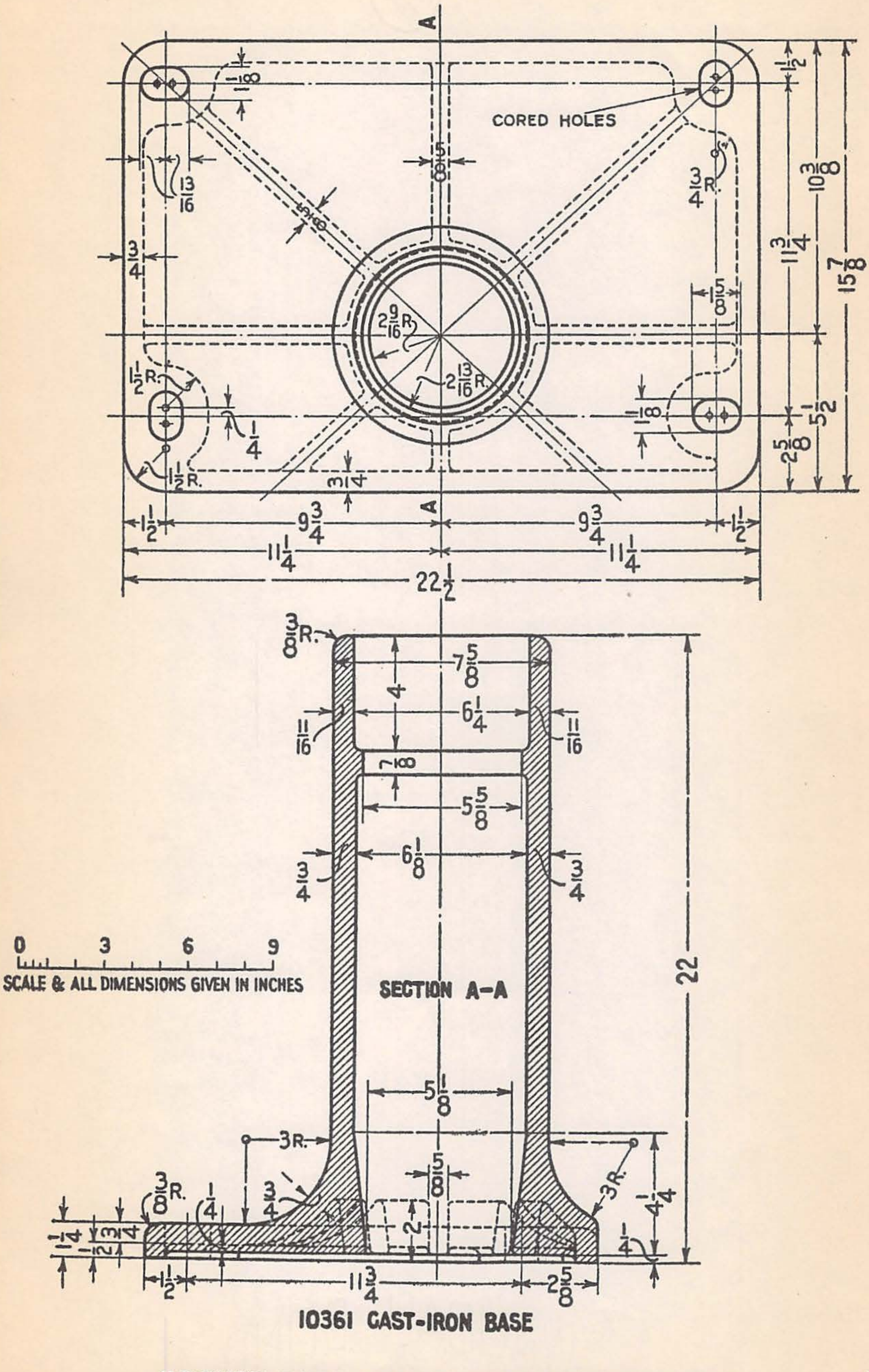
10361 CAST-IRON BASE

SOCKET BASE FOR BRIDGE MAST

						M-1935	MAR 1935	MANUAL-FEB. 1914	JUN. 1910	MAR. 1910

AAR
SIG SEC
1036B

Material shall be in accordance with Specification for Gray Iron Castings.


A
CORED HOLES
1/8
13/16
3/4
5/16
3/4 R.
1 1/2
10 3/8
11 3/4
15 7/8
5/8
2 9/16 R.
2 13/16 R.
1 1/2 R.
1/4
1/8
5 1/2
2 5/8
1 1/2 R.
3/4
A
1/2
9 3/4
9 3/4
1/2
11 1/4
11 1/4
22 1/2
3/8 R.
7 5/8
4
6 1/4
11/16
11/16
7/8
5 5/8
6 1/8
3/4
3/4
0 3 6 9
SCALE & ALL DIMENSIONS GIVEN IN INCHES
SECTION A-A
22
5 1/8
3 R.
3/8 R.
1/4
3/4
5/8
2
1 1/4
3/4
1/2
3 R.
4 1/4
1
1/2
11 3/4
2 5/8

10361 CAST-IRON BASE

SOCKET BASE FOR 5-INCH BRIDGE MAST

M-1946 | OCT. 1946 | M-1935 | MAR 1935 | MANUAL- FEB. 1914 | JUN. 1910 | MAR. 1910

AAR
SIG SEC
1036C

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

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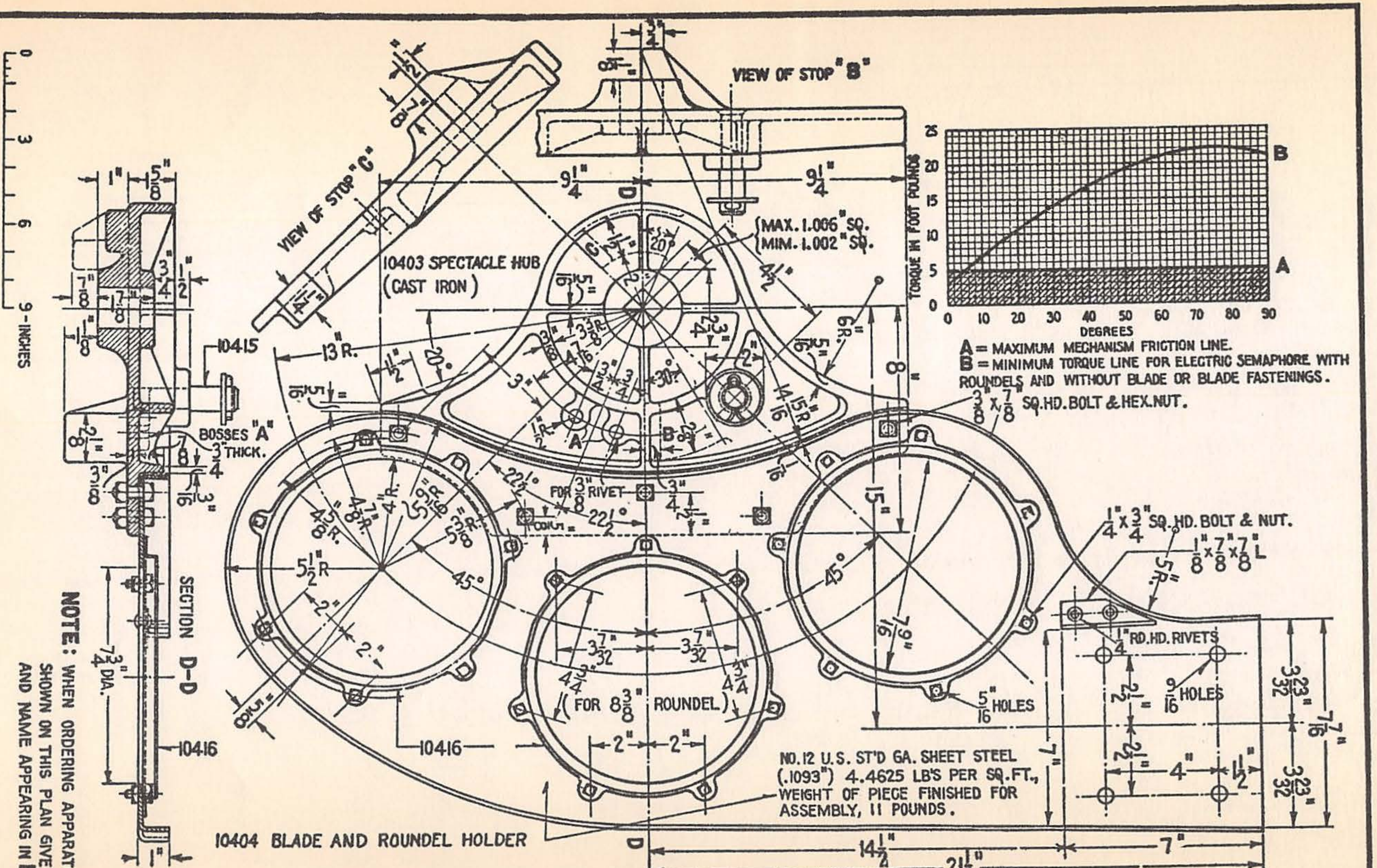
SEMAPHORE SPECTACLE—DESIGN "A"


VIEW OF STOP "B"
VIEW OF STOP "C"
10403 SPECTACLE HUB (CAST IRON)
(MAX. 1.006" SQ.
(MIM. 1.002" SQ.
13" R.
6" R.
9 1/4"
D
8"
15"
7 9/16"
14 15/16"
45°
30°
20°
22 1/2°
FOR 3/8" RIVET
5 1/2" R
4 3/4" (FOR 8 3/8" ROUNDEL)
3 7/32"
2"
A
B
3/8" x 7/8" SQ.HD. BOLT & HEX.NUT.
1/4" x 3/4" SQ. HD. BOLT & NUT.
1/8" x 7/8" x 7/8" L
1/4" RD.HD. RIVETS
9/16" HOLES
5/16" HOLES
5" R.
NO. 12 U.S. ST'D GA. SHEET STEEL (.1093") 4.4625 LB'S PER SQ.FT., WEIGHT OF PIECE FINISHED FOR ASSEMBLY, 11 POUNDS.
10404 BLADE AND ROUNDEL HOLDER
10416
10415
BOSSES "A" 3/8" THICK.
SECTION D-D
7 3/4" DIA.
14 1/4"
21 1/2"
7"
4"
3 23/32"
7 7/16"
0
3
6
9-INCHES
TORQUE IN FOOT POUNDS
DEGREES
0
10
20
30
40
50
60
70
80
90
5
15
25
A = MAXIMUM MECHANISM FRICTION LINE.
B = MINIMUM TORQUE LINE FOR ELECTRIC SEMAPHORE WITH ROUNDELS AND WITHOUT BLADE OR BLADE FASTENINGS.

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

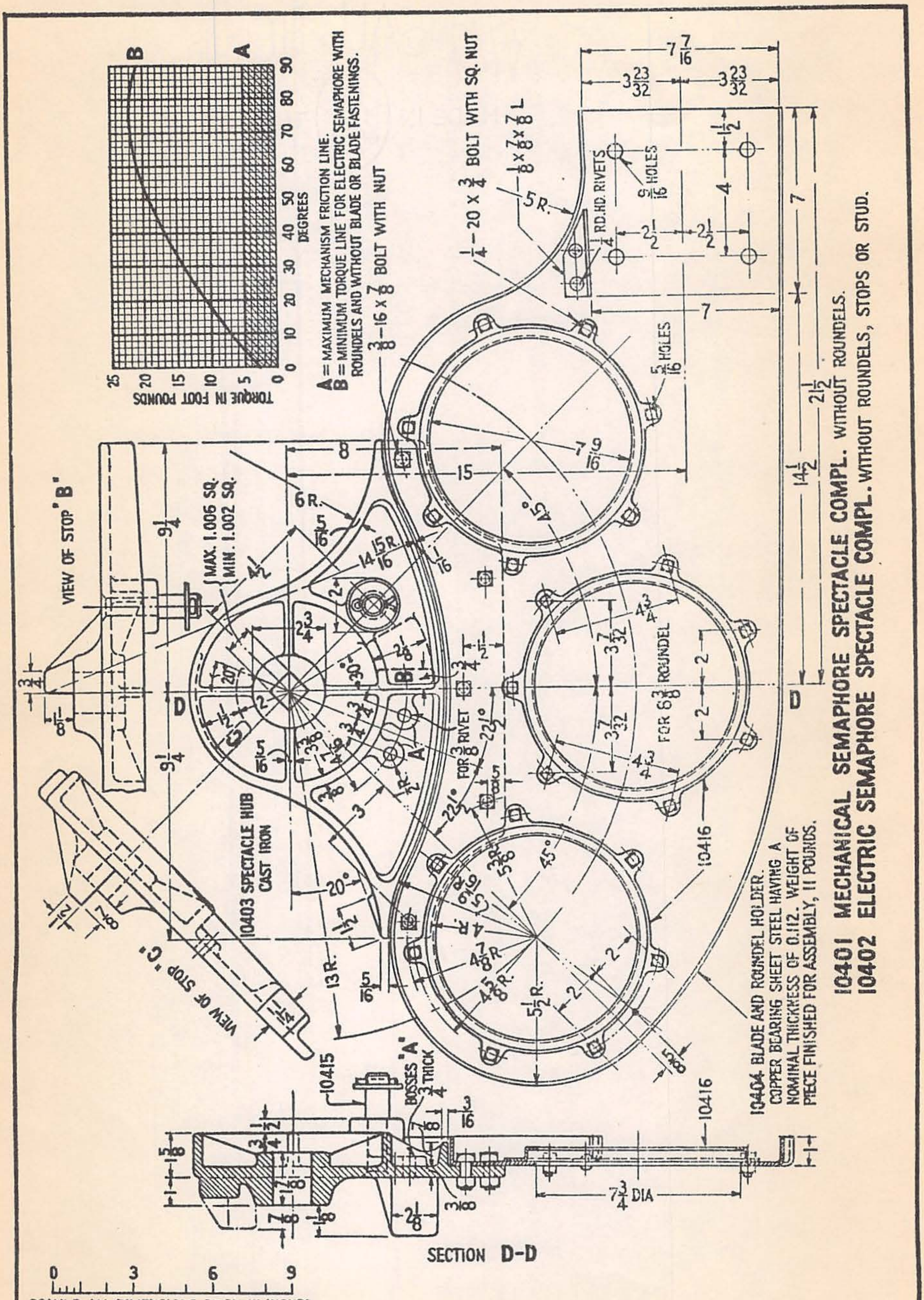
10401 MECHANICAL SEMAPHORE SPECTACLE COMPL. (WITHOUT ROUNDELS)

10402 ELECTRIC SEMAPHORE SPECTACLE COMPL. (WITHOUT ROUNDELS)

NOTE: 10402 FURNISHED WITHOUT STOPS OR STUD.

M-1931	SEP. 1930	MANUAL-MAY 1913	OCT. 1912	OCT. 1911	OCT. 1909	ARA SIG. SEC. 1040B

Cast iron shall be in accordance with Specification for Gray Iron Castings.


TORQUE IN FOOT POUNDS
DEGREES
A = MAXIMUM MECHANISM FRICTION LINE.
B = MINIMUM TORQUE LINE FOR ELECTRIC SEMAPHORE WITH ROUNDELS AND WITHOUT BLADE OR BLADE FASTENINGS.
3/8-16 x 7/8 BOLT WITH NUT
1/4-20 x 3/4 BOLT WITH SQ. NUT
1/8 x 7/8 x 7/8 L
RD.HD. RIVETS
9/16 HOLES
5/16 HOLES
VIEW OF STOP 'B'
VIEW OF STOP 'C'
MAX. 1.006 SQ.
MIN. 1.002 SQ.
10403 SPECTACLE HUB CAST IRON
FOR 3/8 RIVET
FOR 6 3/8 ROUNDEL
10416
10415
BOSSES 'A' 3/4 THICK
7 3/4 DIA
10404 BLADE AND ROUNDEL HOLDER. COPPER BEARING SHEET STEEL HAVING A NOMINAL THICKNESS OF 0.112. WEIGHT OF PIECE FINISHED FOR ASSEMBLY, 11 POUNDS.
10401 MECHANICAL SEMAPHORE SPECTACLE COMPL. WITHOUT ROUNDELS.
10402 ELECTRIC SEMAPHORE SPECTACLE COMPL. WITHOUT ROUNDELS, STOPS OR STUD.
SECTION D-D
0 3 6 9

SCALE & ALL DIMENSIONS GIVEN IN INCHES

SEMAPHORE SPECTACLE — DESIGN "A"

DETAILS

AAR
SIG.SEC.
1040C

			M-1946	OCT. 1946	M-1931	SEP. 1930	MANUAL- MAY 1913	OCT. 1912	OCT. 1911	OCT. 1909

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.

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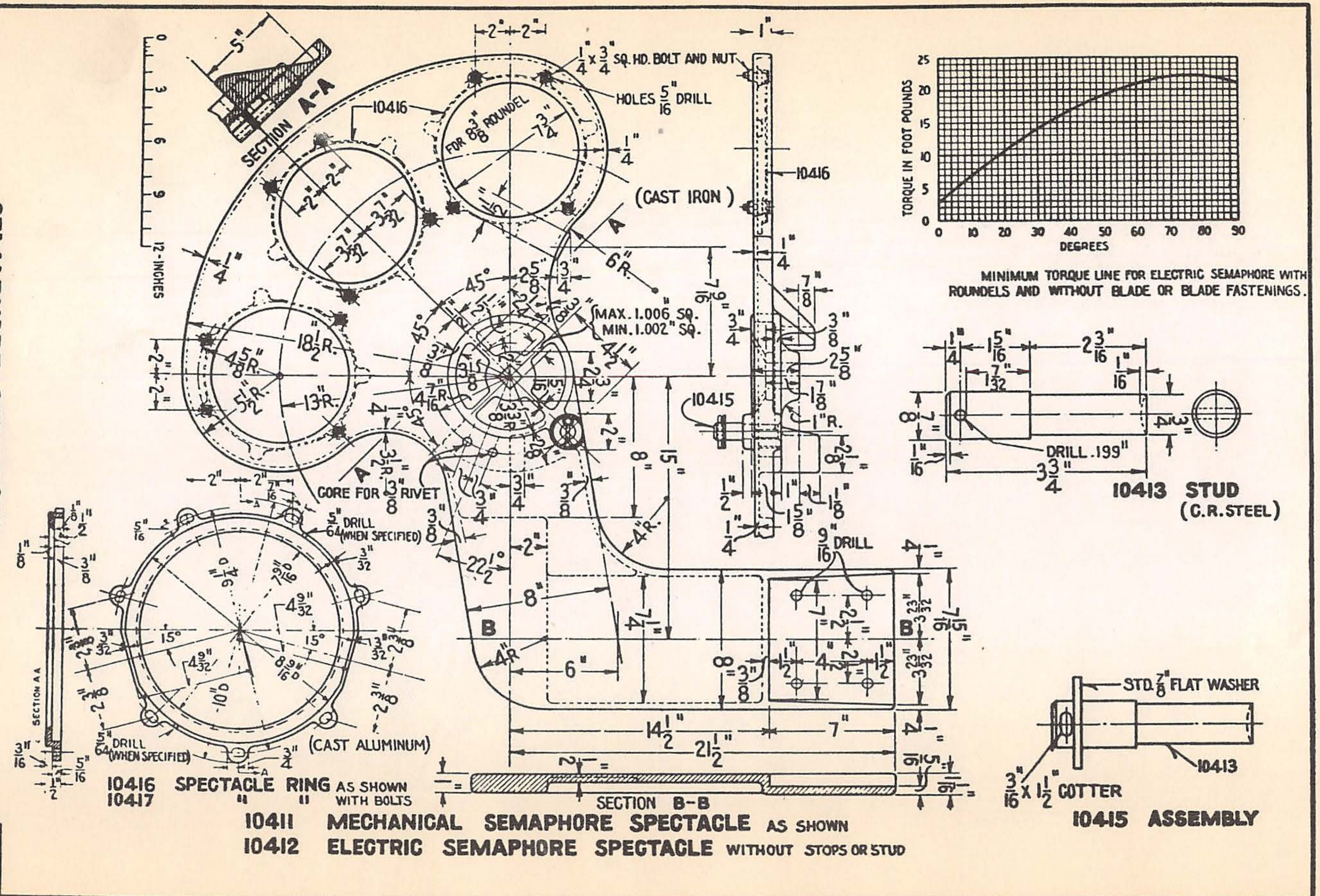
SEMAPHORE SPECTACLE

MAN-1926 | SEP. 1924 | MANUAL-MAY 1913 | OCT. 1912 | OCT. 1911 | OCT. 1909

ARA
SIG. SEC.
1041B

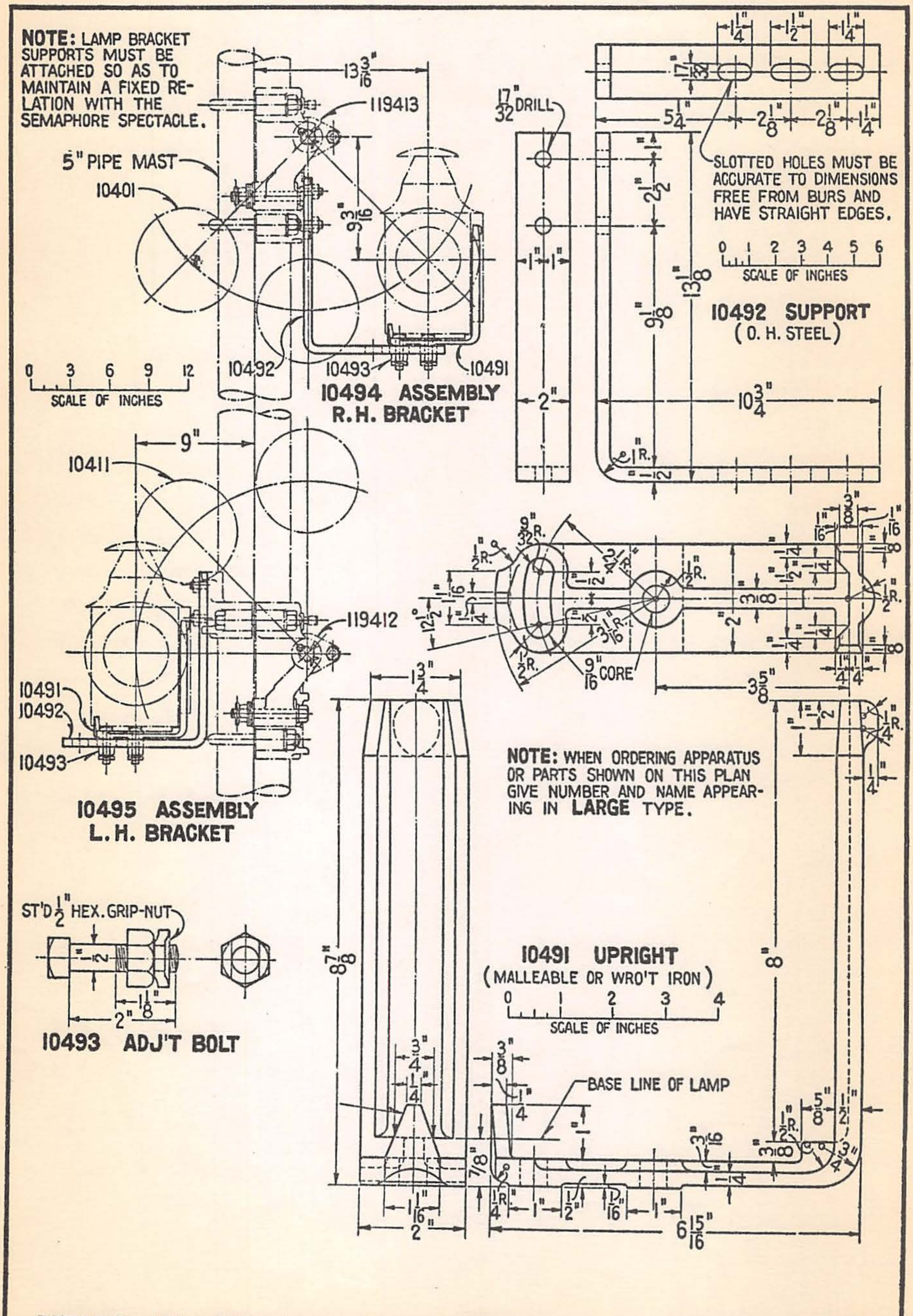


SECTION A-A
5"
0 3 6 9 12-INCHES
10416
FOR 8 3/8" ROUNDEL
7 3/4"
1/4" x 3/4" SQ. HD. BOLT AND NUT
HOLES 5/16" DRILL
(CAST IRON)
6"R.
MAX. 1.006" SQ.
MIN. 1.002" SQ.
18 1/2" R.
13" R.
4 5/8" R.
5 1/2" R.
45°
CORE FOR 3/8" RIVET
22 1/2°
10415
1" R.
4" R.
9/16" DRILL
8"
15"
14 1/2"
21 1/2"
7"
6"
B
SECTION B-B
5/64" DRILL (WHEN SPECIFIED)
9 1/4" D
7 9/16" D
8 9/16" D
10" D
4 9/32"
15°
(CAST ALUMINUM)
SECTION AA
TORQUE IN FOOT POUNDS
0 5 10 15 20 25
0 10 20 30 40 50 60 70 80 90
DEGREES
MINIMUM TORQUE LINE FOR ELECTRIC SEMAPHORE WITH ROUNDELS AND WITHOUT BLADE OR BLADE FASTENINGS.
DRILL .199"
3 3/4"
2 3/16"
1 5/16"
10413 STUD (C.R. STEEL)
STD. 7/8" FLAT WASHER
3/16" x 1 1/2" COTTER
10413
10415 ASSEMBLY

10416 **SPECTACLE RING** AS SHOWN
10417 " " WITH BOLTS

10411 **MECHANICAL SEMAPHORE SPECTACLE** AS SHOWN
10412 **ELECTRIC SEMAPHORE SPECTACLE** WITHOUT STOPS OR STUD

Cast iron shall be in accordance with Specification for Gray Iron Castings.


5" PIPE MAST
10401
119413
13 3/16"
9 3/16"
10492
10493
10491
10494 ASSEMBLY
R.H. BRACKET
0 3 6 9 12
SCALE OF INCHES
9"
10411
119412
10491
10492
10493
10495 ASSEMBLY
L.H. BRACKET
ST'D 1/2" HEX. GRIP-NUT
1/2"
1 1/8"
2"
10493 ADJ'T BOLT
17/32" DRILL
1 1/4"
1 1/2"
1 1/4"
17/32
5 1/4"
2 1/8"
2 1/8"
1 1/4"
2 1/2"
13 1/8"
9 1/8"
1"
1"
2"
10 3/4"
1" R.
1/2"
SLOTTED HOLES MUST BE ACCURATE TO DIMENSIONS FREE FROM BURS AND HAVE STRAIGHT EDGES.
0 1 2 3 4 5 6
SCALE OF INCHES
10492 SUPPORT
(O. H. STEEL)
9/32" R.
1/2" R.
1/2" R.
12 1/2°
3/16" R.
9/16" CORE
1/2" R.
2"
3/8"
3 5/8"
1 3/4"
8 7/8"
8"
1/4" R.
BASE LINE OF LAMP
7/8"
1 1/16"
2"
6 15/16"
10491 UPRIGHT
(MALLEABLE OR WRO'T IRON)
0 1 2 3 4
SCALE OF INCHES

NOTE: LAMP BRACKET SUPPORTS MUST BE ATTACHED SO AS TO MAINTAIN A FIXED RELATION WITH THE SEMAPHORE SPECTACLE.

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

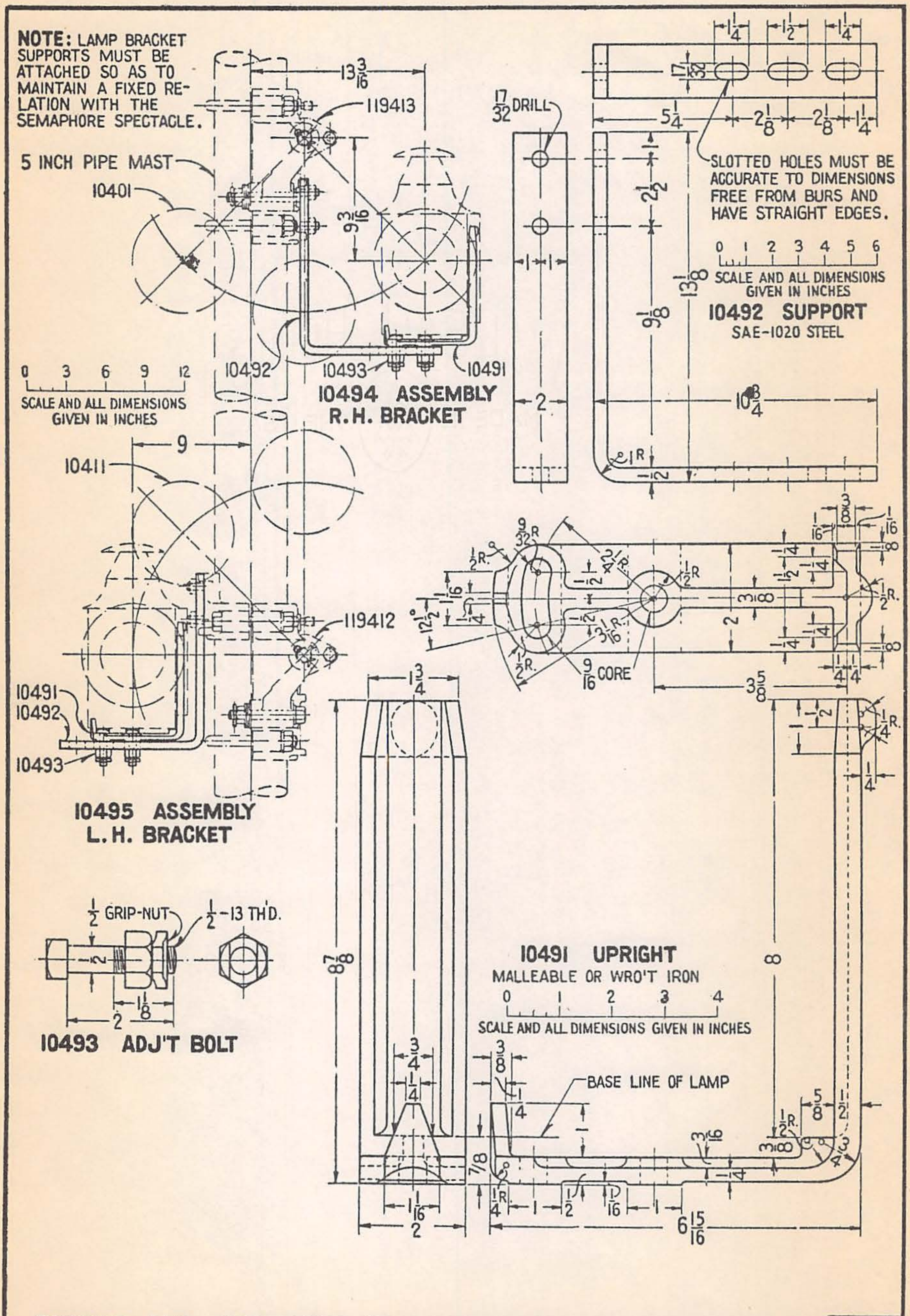
DETAILS AND ASSEMBLY OF ADJUSTABLE LAMP BRACKET

ARA
SIG. SEC.
MAR.1914 OCT.1910 **1049**A

See 1100 and 1596.

Malleable iron shall be in accordance with Specification for Malleable Iron Castings.

Wrought iron shall be in accordance with Specification for Refined Iron B


NOTE: LAMP BRACKET SUPPORTS MUST BE ATTACHED SO AS TO MAINTAIN A FIXED RELATION WITH THE SEMAPHORE SPECTACLE.
5 INCH PIPE MAST
10401
13 3/16
119413
9 3/16
10492
10493
10491
10494 ASSEMBLY R.H. BRACKET
0 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
9
10411
119412
10491
10492
10493
10495 ASSEMBLY L.H. BRACKET
1/2 GRIP-NUT
1/2-13 TH'D.
1/2
1 1/8
2
10493 ADJ'T BOLT
17/32 DRILL
2
1 1/4
1 1/2
1 1/4
17/32
5 1/4
2 1/8
2 1/8
1 1/4
2 1/2
13 1/8
9 1/8
SLOTTED HOLES MUST BE ACCURATE TO DIMENSIONS FREE FROM BURS AND HAVE STRAIGHT EDGES.
0 1 2 3 4 5 6
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
10492 SUPPORT
SAE-1020 STEEL
10 3/4
1 R
1/2
9/32 R
1/2 R
4 1/2 R
1/2 R
1 1/16
1/4
12 1/2°
3 1/16 R
1/2 R
9/16 CORE
3/8
2
3 5/8
3/8
1/16
1/16
1/8
1/2 R
1/4
1/2
1/4 R
1/4
1 3/4
8 7/8
8
10491 UPRIGHT
MALLEABLE OR WRO'T IRON
0 1 2 3 4
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
3/4
1/4
3/8
1/4
BASE LINE OF LAMP
7/8
1/4 R
1/2
1/16
1 1/16
2
6 15/16
3/16
3/8
1/2 R
5/8
1/2
1/4

DETAILS AND ASSEMBLY OF ADJUSTABLE LAMP BRACKET

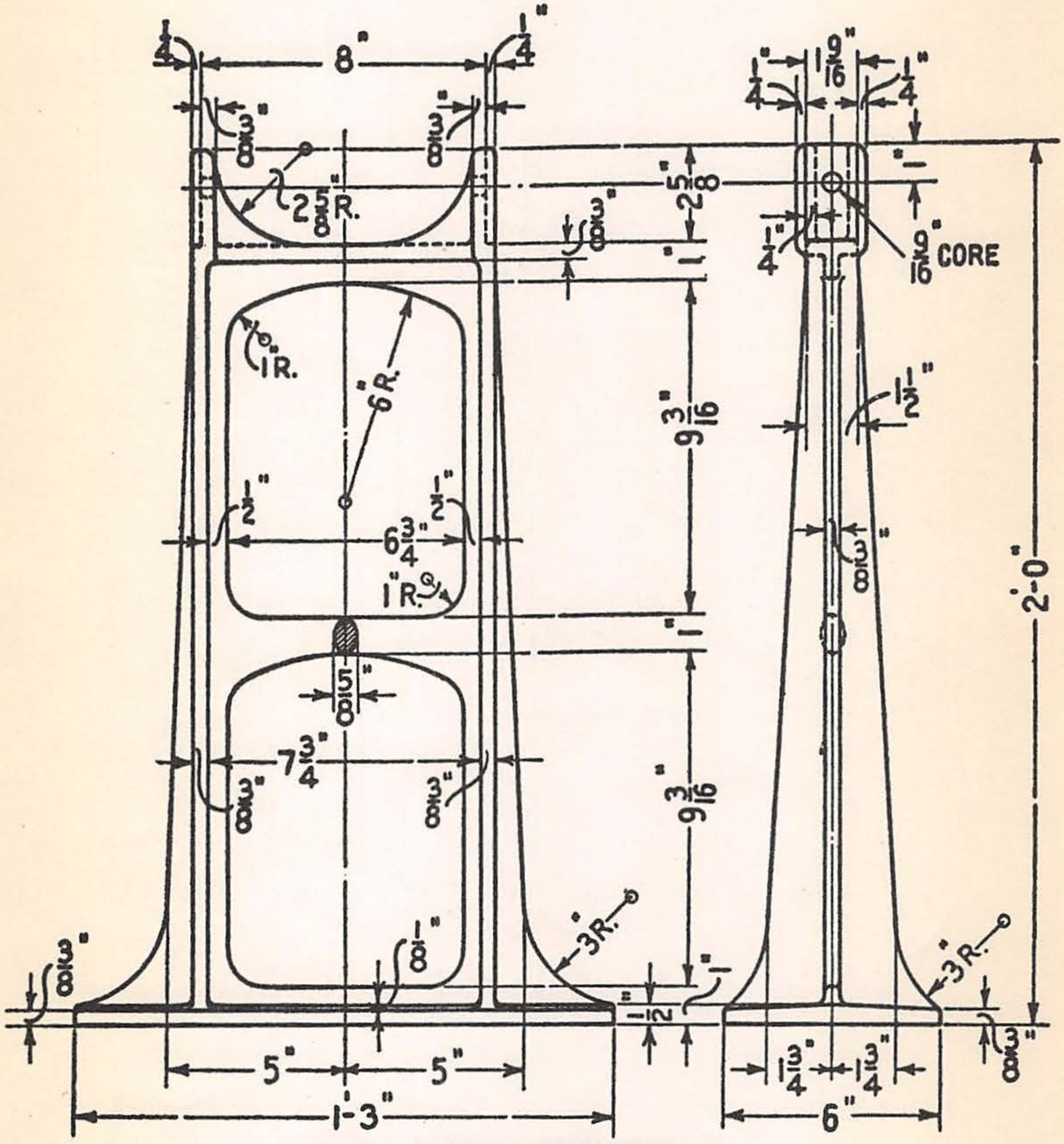
AAR
SIG. SEC.
1049B

M-1946 OCT.1946 MAR.1914 OCT.1910

Malleable iron shall be in accordance with Specification for Malleable Iron Castings, Manual Part 89; Wrought iron shall be in accordance with Specification for Refined Iron Bars, Manual Part 90; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.

PRINTED IN U. S. A.

RECEIVED
FEB
12
1948
SPECIFICATION DEPT.



1/4"
8"
1/4"
3/8"
3/8"
2 5/8" R.
2 5/8"
3/8"
1"
1 R.
6" R.
9 3/16"
1/2"
6 3/4"
1/2"
1" R.
1"
5/8"
7 3/4"
3/8"
3/8"
9 3/16"
3/8"
1/8"
3" R.
1"
1/2"
5"
5"
1'-3"
1/4"
1 9/16"
1/4"
1/4"
1"
1/4"
9/16" CORE
1 1/2"
3/8"
2'-0"
3" R.
3/8"
1 3/4"
1 3/4"
6"

10521 LADDER FOUNDATION
(CAST IRON)

0 3 6 9 12
SCALE OF INCHES

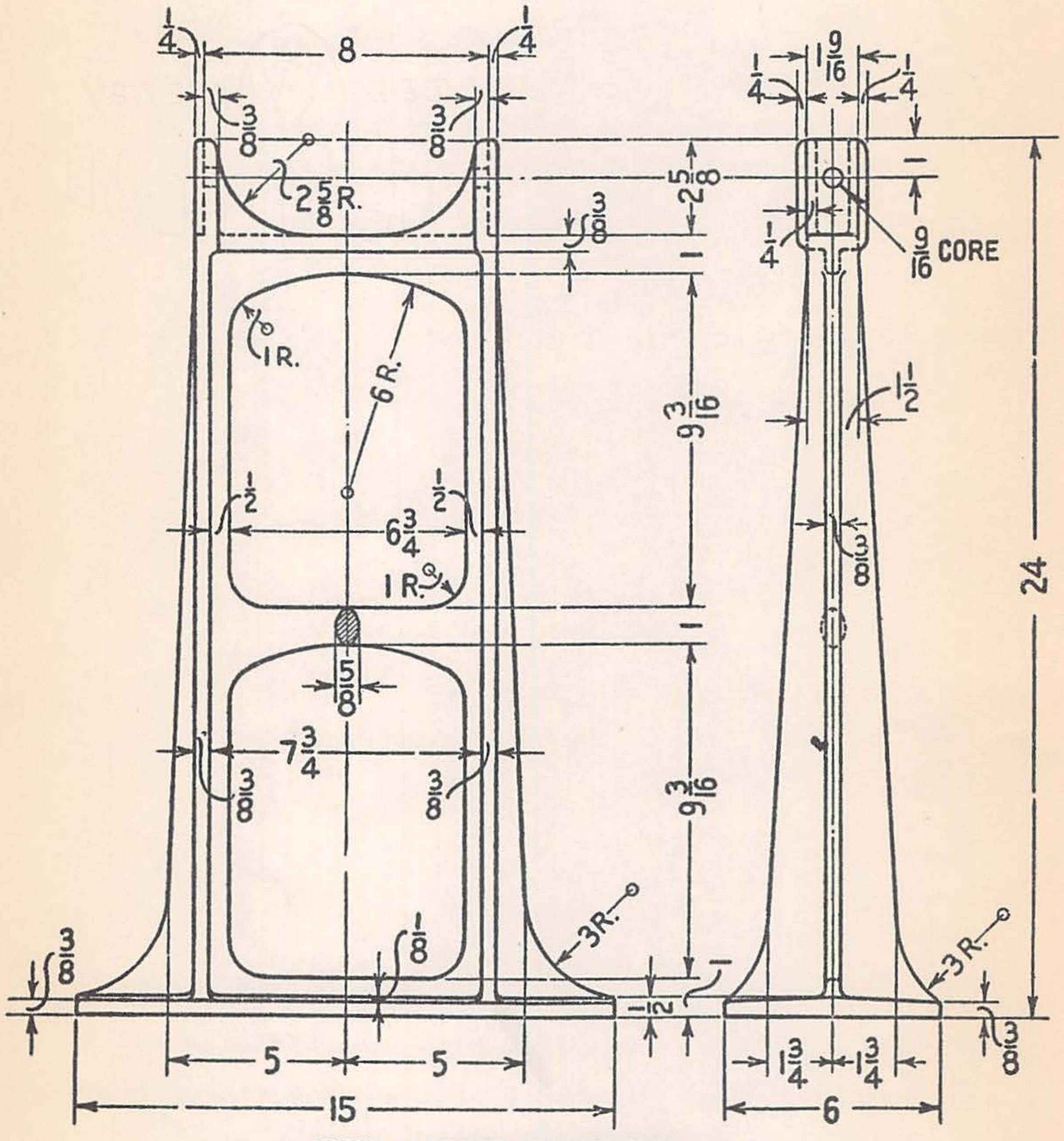
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

LADDER FOUNDATION

RSA
1052

MANUAL-DEC.1913 | JUN.1910

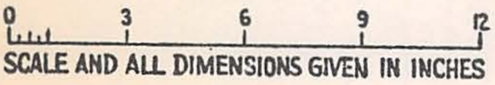
Material shall be in accordance with Specification for Gray Iron Castings.



1/4
8
1/4
3/8
3/8
2 5/8 R.
2 5/8
3/8
1
1 R.
6 R.
9 3/16
1/2
1/2
6 3/4
1 R.
1
5/8
7 3/4
3/8
3/8
9 3/16
3R.
1/8
3/8
1/2
1
5
5
15
1/4
1 9/16
1/4
1
1/4
9/16 CORE
1 1/2
3/8
24
3R.
3/8
1 3/4
1 3/4
6

10521 LADDER FOUNDATION

CAST IRON



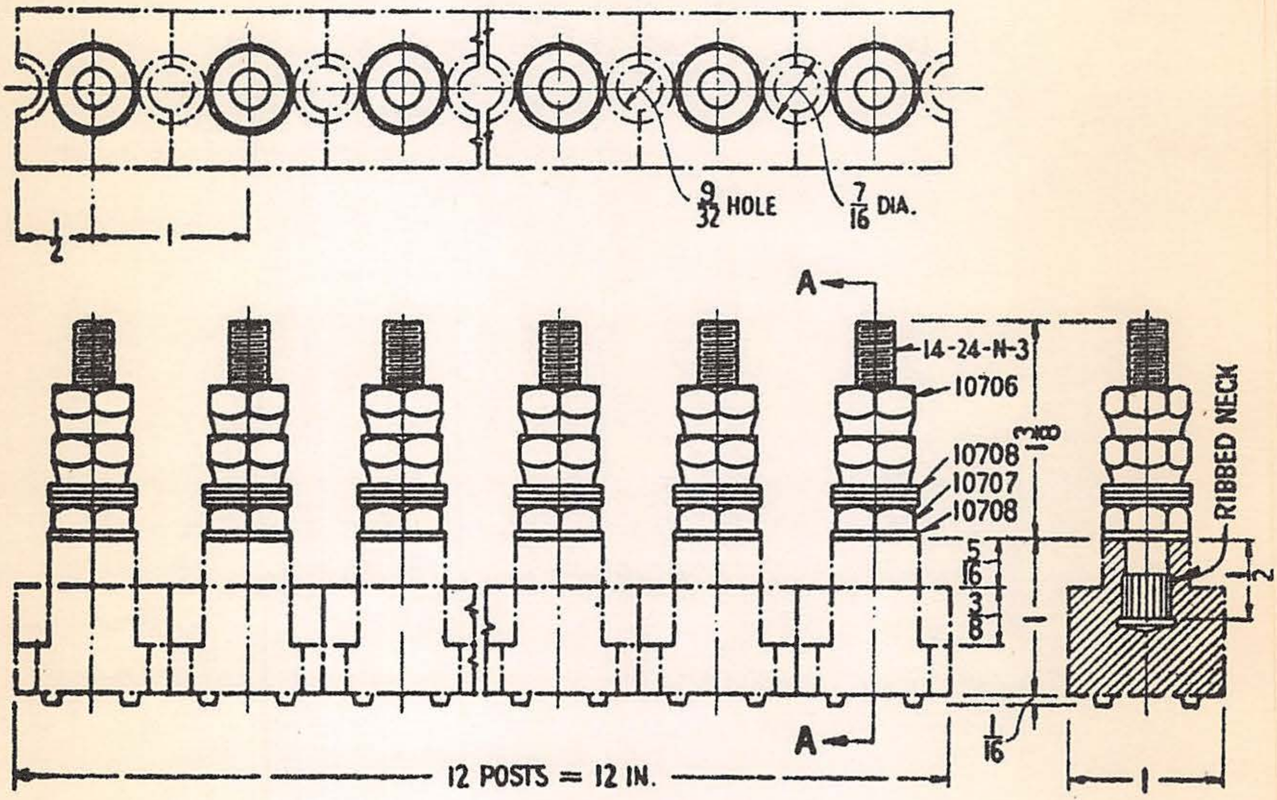
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

LADDER FOUNDATION

M-1946	OCT. 1946	MANUAL-DEC. 1913	JUN. 1910	AAR SIG. SEC. 1052B

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

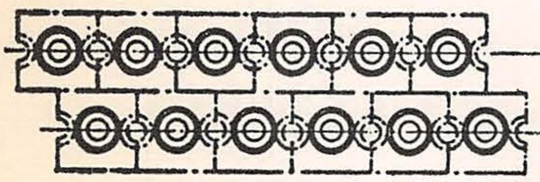
RECEIVED
FEB
12
1948
SPECIFICATION DEPT.


9/32 HOLE
7/16 DIA.
1/2
1
A
14-24-N-3
10706
10708
10707
10708
1 3/8
5/16
3/8
1/16
RIBBED NECK
1/2
1
A
12 POSTS = 12 IN.

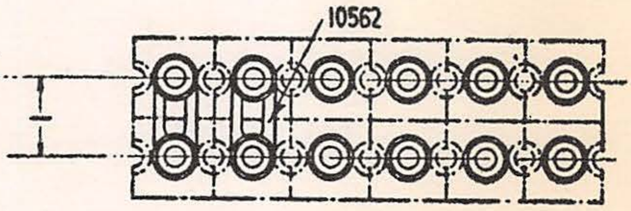
TERMINAL BLOCK ASSEMBLIES

SECTION AA

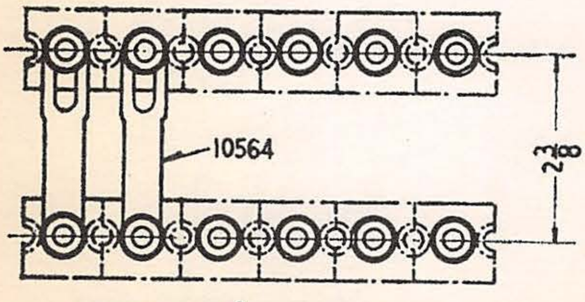
10541 WITH NICKEL PLATED COPPER BASE ALLOY BOLTS — BRASS.
10542 " " " " " " " HIGH STRENGTH.
10543 " NICKEL BASE ALLOY BOLTS.



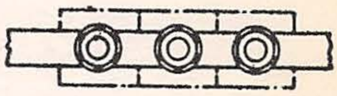
STAGGERED FOR THROUGH WIRE CONNECTIONS TO SINGLE POSTS.



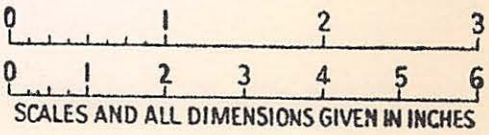
FACE TO FACE FOR USE WITH 1 INCH CONNECTORS.



SPACED FOR 2 3/8 INCH CENTERS



SINGLE ROW WITH CONNECTOR BUS


0
1
2
3
0
1
2
3
4
5
6

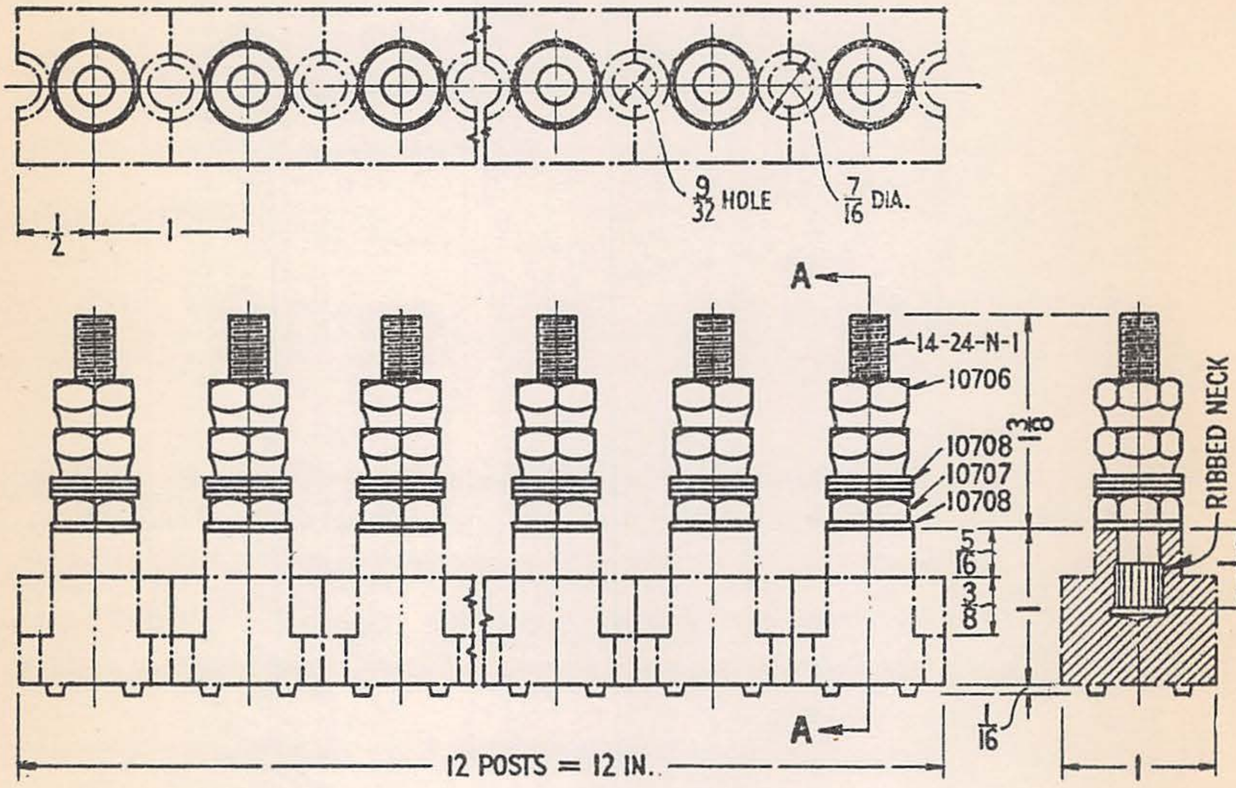
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

MULTIPLE UNIT TERMINAL BLOCK

M-1940	OCT. 1940	M-1939	MAR. 1939

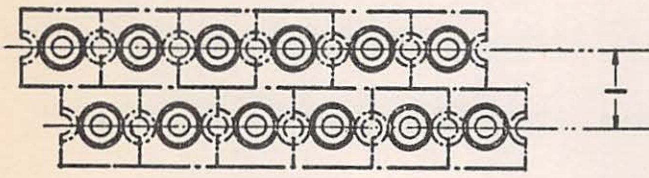
AAR
SIG. SEC.
1054B

Material shall be in accordance with Specifications 159 and 183.

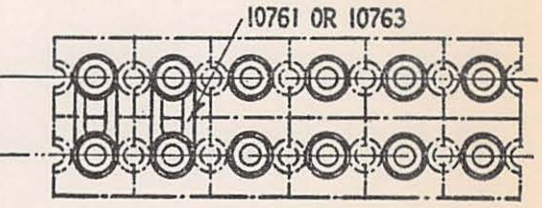

9/32 HOLE
7/16 DIA.
1/2
1
A
A
14-24-N-1
10706
10708
10707
10708
3/8
5/16
3/8
1
1/16
12 POSTS = 12 IN.
RIBBED NECK
1/2
1

TERMINAL BLOCK ASSEMBLIES **SECTION A A**

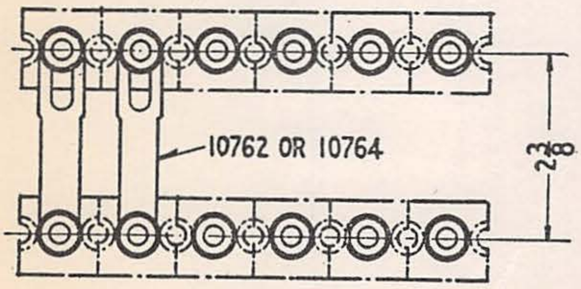
10541 WITH NICKEL PLATED COPPER BASE ALLOY BOLTS — BRASS.
10542 " " " " " " " HIGH STRENGTH.
10543 " NICKEL BASE ALLOY BOLTS.



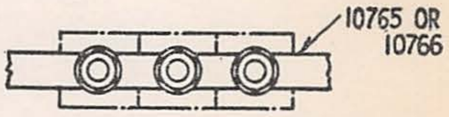
STAGGERED FOR THROUGH WIRE
CONNECTIONS TO SINGLE POSTS


10761 OR 10763

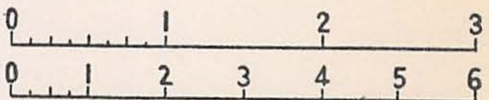
FACE TO FACE FOR USE WITH
1 INCH CONNECTORS.


10762 OR 10764
2 3/8

SPACED FOR 2$\frac{3}{8}$ INCH CENTERS.


10765 OR
10766

SINGLE ROW WITH CONNECTOR BUS


0
1
2
3
0
1
2
3
4
5
6

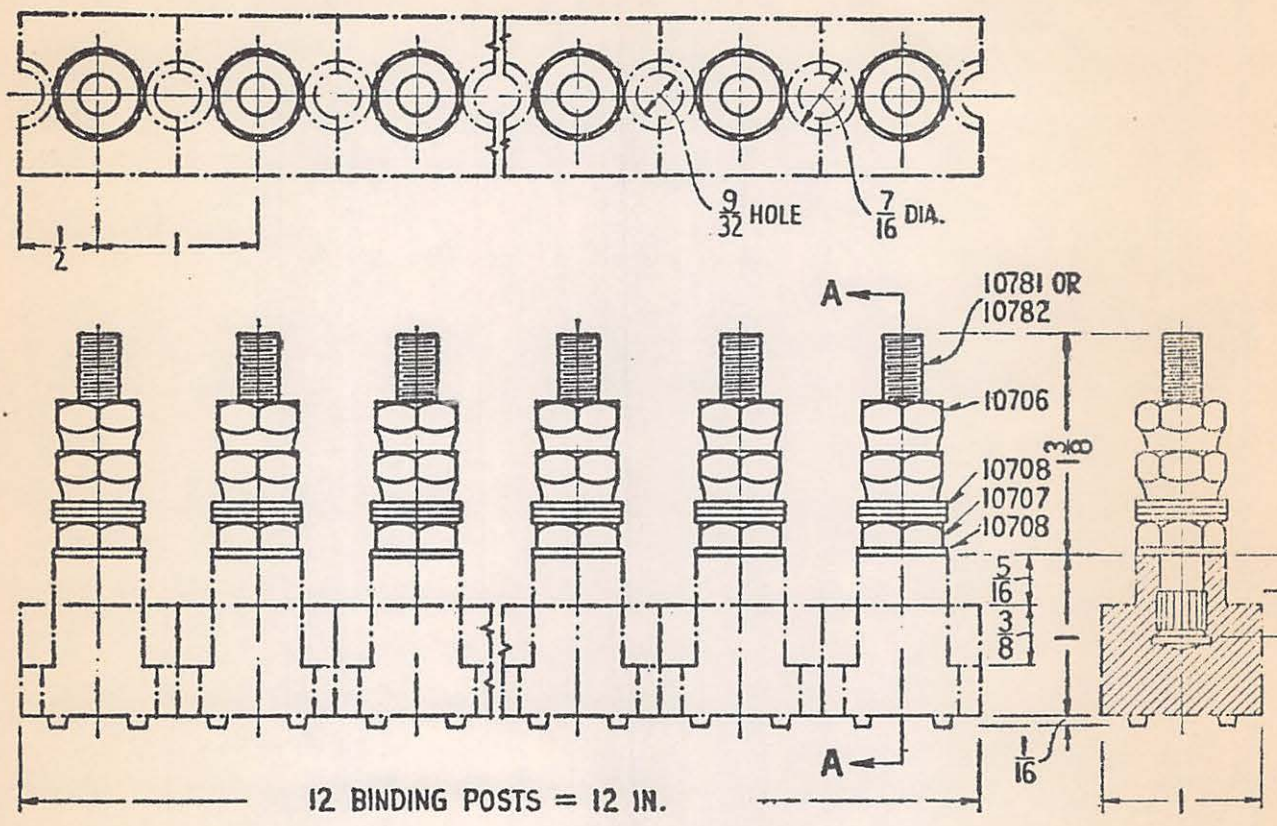
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

MULTIPLE UNIT TERMINAL BLOCK

AAR
SIG. SEC.
1054C

M-1941	SEP. 1941	M-1940	OCT. 1940	M-1939	MAR. 1939

Material shall be in accordance with Specifications 159 and 183.

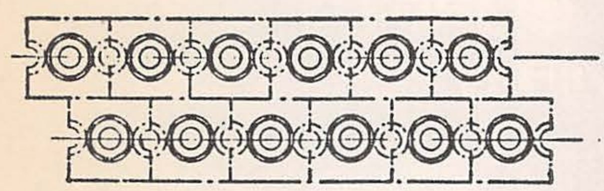


9/32 HOLE
7/16 DIA.
1/2
1
A
A
10781 OR 10782
10706
10708
10707
10708
3/8
5/16
3/8
1
1/16
1/2
1
12 BINDING POSTS = 12 IN.

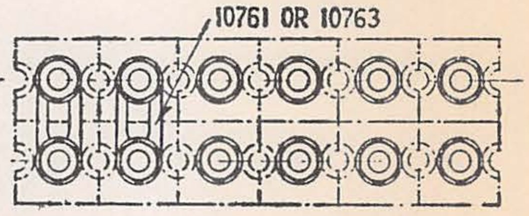
TERMINAL BLOCK ASSEMBLIES

SECTION AA

10544 WITH COPPER-SILICON ALLOY BINDING POST 10781
10545 WITH NICKEL-COPPER ALLOY " " 10782

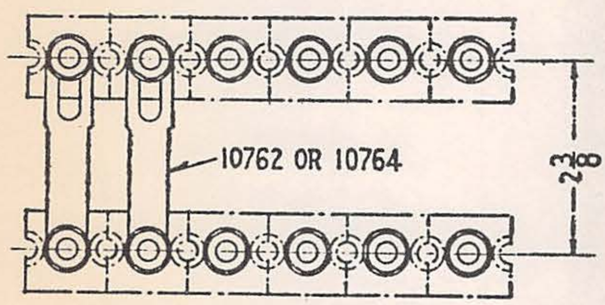


STAGGERED FOR THROUGH WIRE CONNECTIONS
TO SINGLE BINDING POSTS.



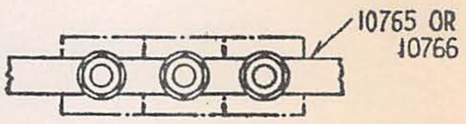
10761 OR 10763

FACE TO FACE FOR USE WITH
1 INCH CONNECTORS.



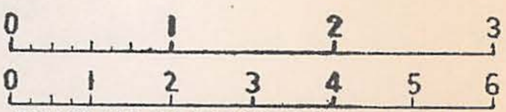
10762 OR 10764
2 3/8

SPACED FOR $2\frac{3}{8}$ INCH CENTERS.



10765 OR 10766

SINGLE ROW WITH CONNECTOR BUS



0
1
2
3
0
1
2
3
4
5
6

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

MULTIPLE UNIT TERMINAL BLOCK

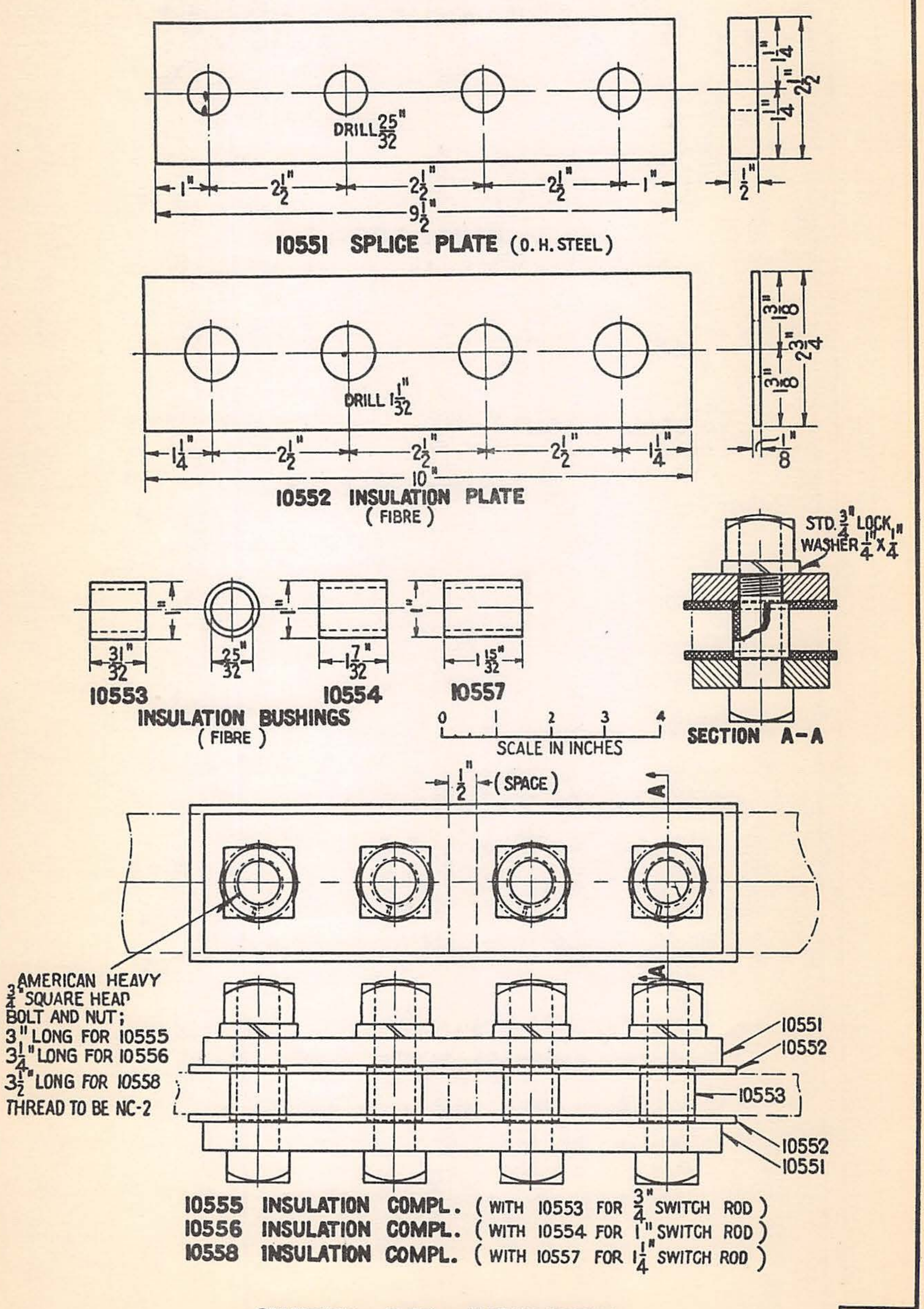
AAR
SIG. SEC.
1054D

			M-1946	OCT. 1946	M-1941	SEP. 1941	M-1940	OCT. 1940	M-1939	MAR. 1939

Material shall be in accordance with Specification 183,
Manual Part 155.

PRINTED IN U. S. A.

FEB
12
1948
SPECIFICATION DEPT.


DRILL 25/32"
1" 2 1/2" 2 1/2" 2 1/2" 1"
9 1/2"
1 1/4" 1 1/4" 2 1/2"
1/2"
10551 SPLICE PLATE (O. H. STEEL)
DRILL 1 1/32"
1 1/4" 2 1/2" 2 1/2" 2 1/2" 1 1/4"
10"
1 3/8" 1 3/8" 2 3/4"
1/8"
10552 INSULATION PLATE
(FIBRE)
STD. 3/4" LOCK WASHER 1/4" X 1/4"
1"
31/32"
25/32"
1 7/32"
1 15/32"
10553
10554
10557
INSULATION BUSHINGS
(FIBRE)
0 1 2 3 4
SCALE IN INCHES
SECTION A-A
1/2" (SPACE)
A
A
3/4" AMERICAN HEAVY SQUARE HEAD BOLT AND NUT;
3" LONG FOR 10555
3 1/4" LONG FOR 10556
3 1/2" LONG FOR 10558
THREAD TO BE NC-2
10551
10552
10553
10552
10551

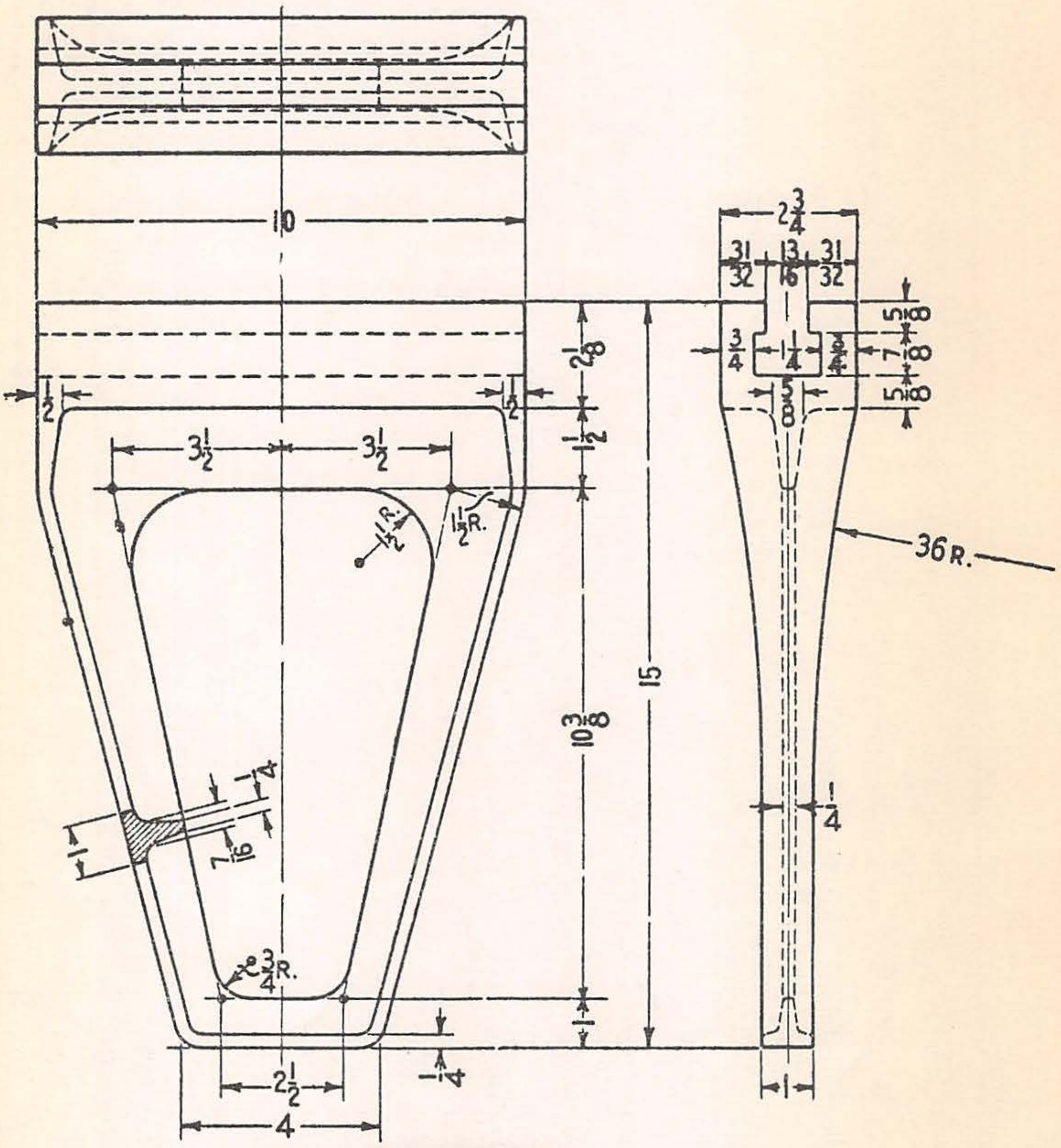
10555 INSULATION COMPL. (WITH 10553 FOR 3/4" SWITCH ROD)
10556 INSULATION COMPL. (WITH 10554 FOR 1" SWITCH ROD)
10558 INSULATION COMPL. (WITH 10557 FOR 1 1/4" SWITCH ROD)

SWITCH - ROD INSULATION

						M-1936	MAR1936	MAN-1926	MAR.1925	SEP.1914	OCT.1910

AAR
SIG. SEC.
1055C

Fibre shall be in accordance with Specification 13.


10
2 3/4
31/32
13/16
31/32
5/8
7/8
5/8
3/4
1/4
3/4
5/8
1/2
1/2
2 1/8
1 1/2
3 1/2
3 1/2
1/2 R.
1 1/2 R.
36 R.
15
10 3/8
1/4
1/4
7/16
1
1
3/4 R.
1/4
1
2 1/2
4

10581 ANCHOR POST
[CAST IRON]

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

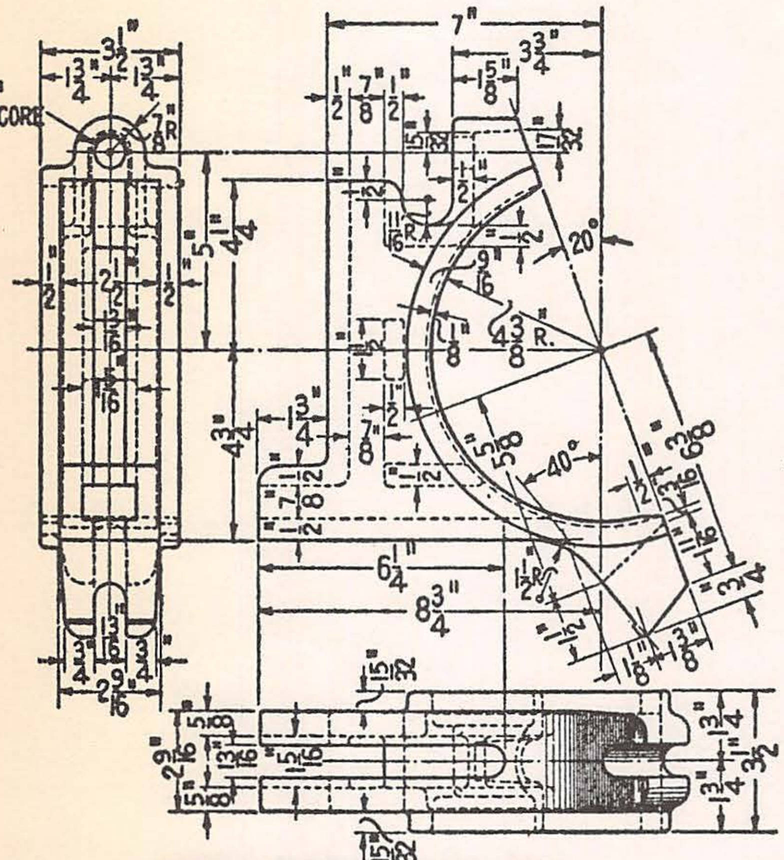
0 1 2 3 4 5 6
SCALE AND ALL DIMENSIONS
GIVEN IN INCHES

ANCHOR POST

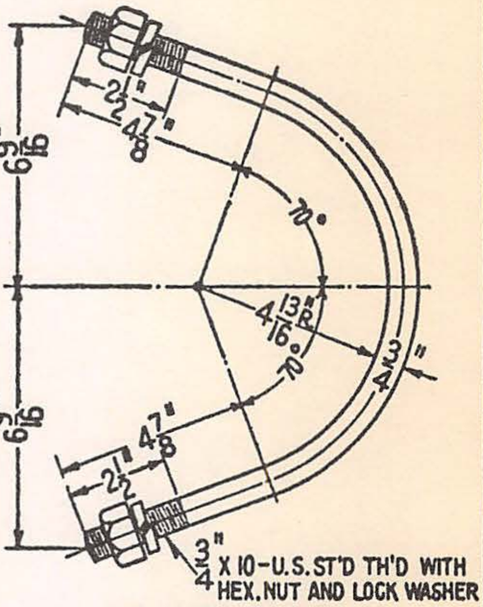
M-1938 | APR. 1938 | MAR. 1913

AAR
SIG. SEC.
1058B

See 1103 and 1104.
Material shall be in accordance with Specification for Gray Iron Castings.

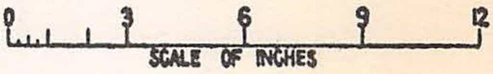

7"
3 3/4"
1 5/8"
3 1/2"
1 3/4"
1 3/4"
13/16" CORE
7/8 R
1/2"
7/8"
1/2"
15/32
17/32
5"
4 1/4"
20°
4 3/8" R.
9/16
5 5/8
40°
6 3/8
4 3/4"
1 3/4"
7/8"
6 1/4"
8 3/4"
1 1/2" R.
1 1/2"
1 1/8"
1 3/8"
3/4"
13/16
2 9/16"
15/32
5/16
3 1/2
1 3/4"

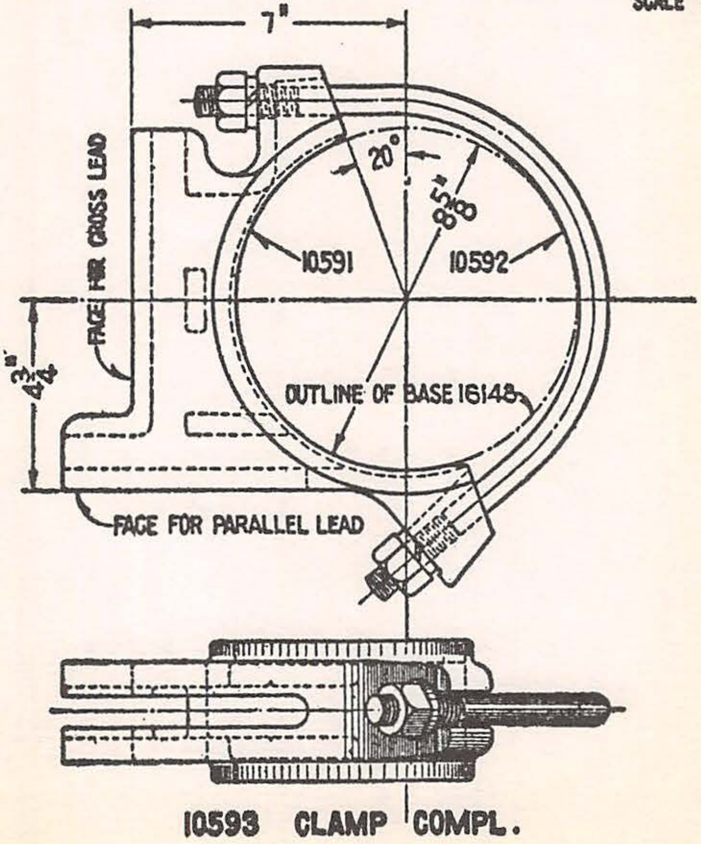
10591 CLAMP – FRONT HALF
(CAST IRON)


6 9/16"
6 9/16"
2 1/2"
4 7/8"
70°
4 13/16" R
70°
3/4"
2 1/2"
4 7/8"
3/4" X 10-U.S. ST'D TH'D WITH HEX. NUT AND LOCK WASHER

10592 "U" BOLT
(O.H. STEEL)

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.


0
3
6
9
12
SCALE OF INCHES

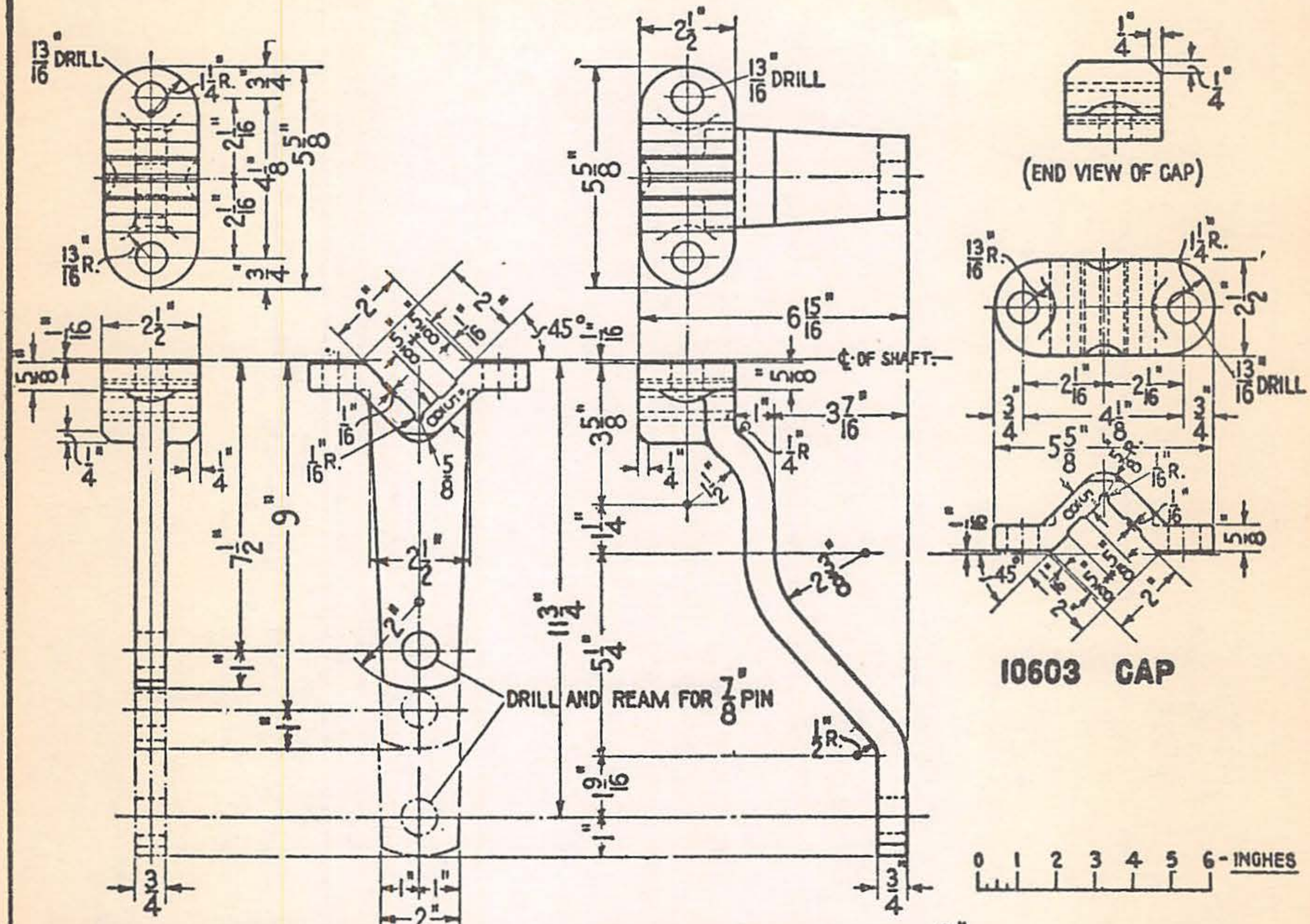

7"
20°
8 5/8"
10591
10592
FACE FOR CROSS LEAD
4 3/4"
OUTLINE OF BASE 16148
FACE FOR PARALLEL LEAD

10593 CLAMP COMPL.

CLAMP FOR BASE OF GROUND MAST SIGNALS
(DETAILS AND ASSEMBLY)

						DEC. 1915	SEP. 1915	MAY 1915	M-1-1914	OCT. 1911	ARA SIG. SEC. 1059A

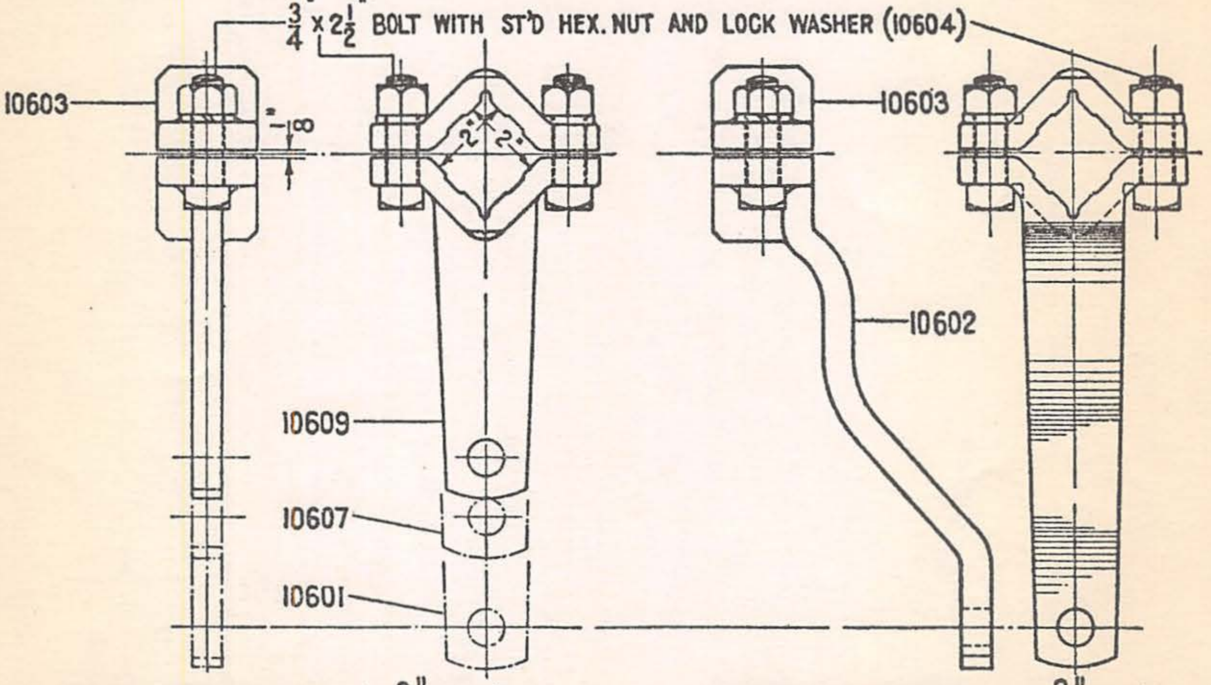
See 1043 and 1044.
Cast iron shall be in accordance with Specification for Gray Iron Castings.



13/16" DRILL
1 1/4" R.
3/4"
2 1/16"
4 1/8"
5 5/8"
13/16" R.
2 1/2"
1/16"
5/8"
1/4"
7 1/2"
9"
1"
2"
45°
5/8
2 1/2"
11 3/4"
3 5/8"
1 1/4"
5 1/4"
1 9/16"
DRILL AND REAM FOR 7/8" PIN
13/16" DRILL
6 15/16"
℄ OF SHAFT
3 7/16"
1/2" R.
2 3/8"
(END VIEW OF CAP)
13/16" DRILL
10603 CAP
0 1 2 3 4 5 6 - INCHES

10601 STRAIGHT ARM (11 3/4")
10607 STRAIGHT ARM (9")
10609 STRAIGHT ARM (7 1/2")

10602 BENT ARM (11 3/4")
(MATERIAL - MILD STEEL FORGINGS)



3/4 x 2 1/2 BOLT WITH ST'D HEX. NUT AND LOCK WASHER (10604)
10603
1/8"
2"
2"
10603
10602
10609
10607
10601

10605 ASSEMBLY (11 3/4" ARM)
10608 ASSEMBLY (9" ARM)
106010 ASSEMBLY (7 1/2" ARM)

10606 ASSEMBLY (11 3/4" ARM)

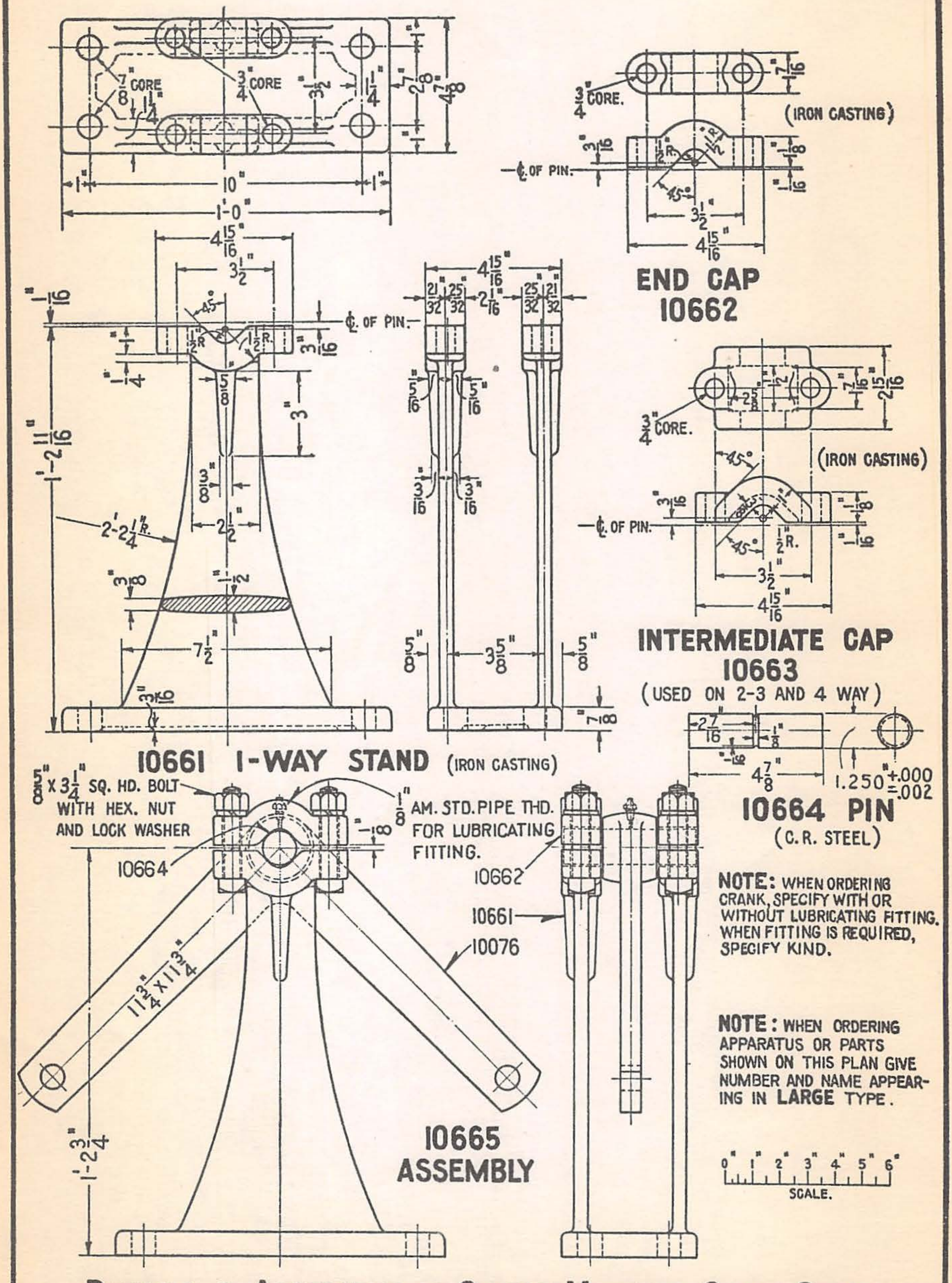
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NAME AND NUMBER APPEARING IN **LARGE** TYPE.

ROCKING SHAFT ARMS

RSA
1060

OCT. 1912 MAR. 1912

See 1061 and 1062.



7/8" CORE
3/4" CORE
1'-0"
10"
4 15/16"
3 1/2"
℄ OF PIN
END CAP
10662
(IRON CASTING)
INTERMEDIATE CAP
10663
(USED ON 2-3 AND 4 WAY)
10664 PIN
(C.R. STEEL)
1.250 +.000 −.002
4 7/8"
2 7/16"
1'-2 11/16"
2'-2 1/4" R.
7 1/2"
3 5/8"
10661 I-WAY STAND (IRON CASTING)
5/8" x 3 1/4" SQ. HD. BOLT WITH HEX. NUT AND LOCK WASHER
1/8" AM. STD. PIPE THD. FOR LUBRICATING FITTING.
10664
10662
10661
10076
11 3/4" x 11 3/4"
1'-2 3/4"
10665
ASSEMBLY
0" 1" 2" 3" 4" 5" 6"
SCALE.

NOTE: WHEN ORDERING CRANK, SPECIFY WITH OR WITHOUT LUBRICATING FITTING. WHEN FITTING IS REQUIRED, SPECIFY KIND.

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

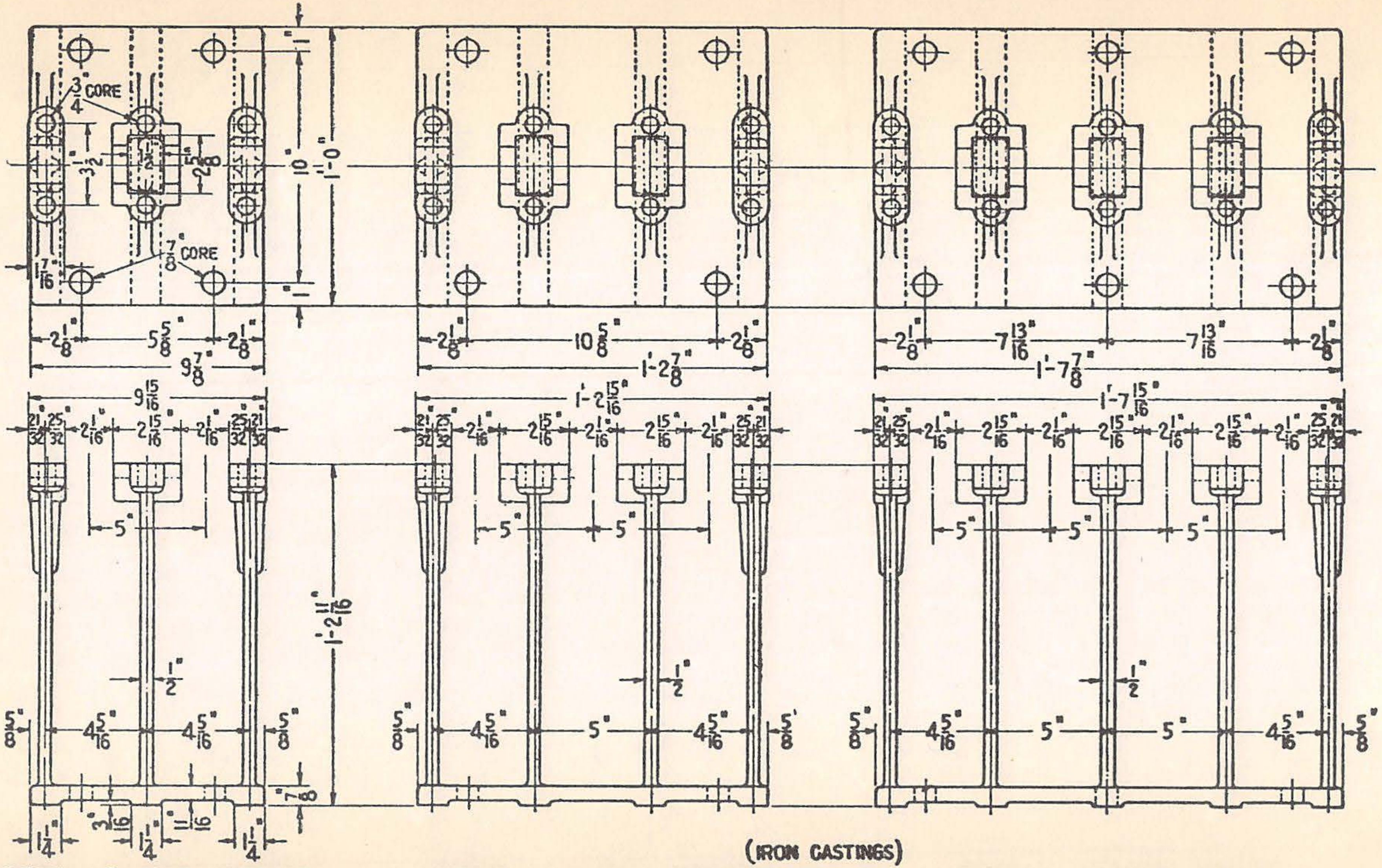
DETAILS & ASSEMBLY OF SINGLE VERTICAL CRANK STAND

						M-1934	MAR1934	MANUAL-NOV.1913	OCT.1911	ARA SIG. SEC. 1066B

See 1067.

Cast iron shall be in accordance with Specification for Gray Iron Castings.

DETAILS OF MULTIPLE VERTICAL CRANK STANDS

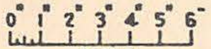


3/4" CORE
7/8" CORE
3 1/2"
1 1/2"
2 5/8"
10"
1'-0"
1"
1 7/16"
2 1/8"
5 5/8"
9 7/8"
10 5/8"
1'-2 7/8"
7 13/16"
1'-7 7/8"
9 15/16
1'-2 15/16"
1'-7 15/16"
21/32
25/32
2 1/16"
2 15/16"
5"
1'-2 11/16"
1/2"
5/8"
4 5/16"
7/8"
3/16"
11/16"
1 1/4"

(IRON CASTINGS)

10671 2-WAY STAND **10672 3-WAY STAND** **10673 4-WAY STAND**

10674 " " COMP. **10675 " " COMPL.** **10676 " " COMPL.**



SCALE.

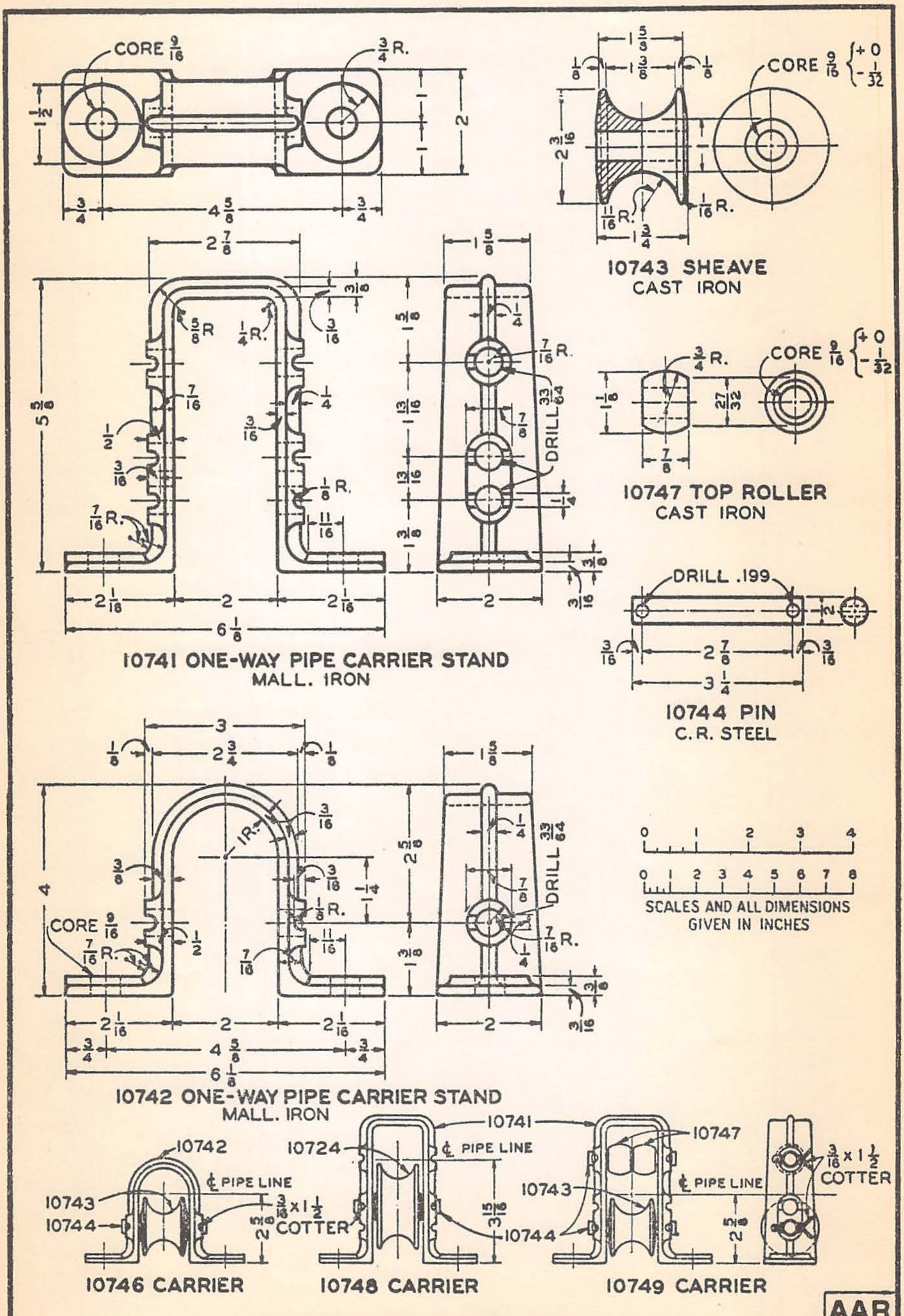
NOTE: COMPLETE ORDER NUMBERS 10674, 10675 AND 10676 INCLUDE DETAIL PARTS 10076-10662-10683-10664 WITH BOLTS.

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

MANUAL-NOV.1913 OCT.1911

RSA 1067

See 1066.
Material shall be in accordance with Specification for Gray Iron Castings.


CORE 9/16
3/4 R.
1 1/2
1
1
2
3/4
4 5/8
3/4
2 7/8
3/16
5/8 R
1/4 R.
3/16
5 5/8
7/16
1/4
1/2
3/16
3/16
1/8 R.
7/16 R.
11/16
2 1/16
2
2 1/16
6 1/8
1 5/8
1/4
7/16 R.
1 5/8
1 13/16
7/8
DRILL 33/64
13/16
1 1/4
1 3/8
3/8
3/16
2
1 5/8
1/8
1 3/8
1/8
CORE 9/16 {+0 -1/32
2 3/16
11/16 R.
1/16 R.
1 3/4
3/4 R.
CORE 9/16 {+0 -1/32
1 1/8
27/32
7/8
DRILL .199
1/2
3/16
2 7/8
3/16
3 1/4
3
1/8
2 3/4
1/8
3/16
1 R.
4
3/8
3/16
1 1/4
1/8 R.
CORE 9/16
7/16 R.
1/2
7/16
11/16
2 5/8
1 3/8
1 5/8
1/4
7/8
DRILL 33/64
1/4
7/16 R.
3/8
3/16
2
2 1/16
2
2 1/16
3/4
4 5/8
3/4
6 1/8
0 1 2 3 4
0 1 2 3 4 5 6 7 8
10742
10724
10741
10747
10743
10744
℄ PIPE LINE
3/16 x 1 1/2 COTTER
2 5/8
3 15/16
10743
10744
℄ PIPE LINE
3/16 x 1 1/2 COTTER
2 5/8

10741 ONE-WAY PIPE CARRIER STAND
MALL. IRON

10743 SHEAVE
CAST IRON

10747 TOP ROLLER
CAST IRON

10744 PIN
C.R. STEEL

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

10742 ONE-WAY PIPE CARRIER STAND
MALL. IRON

10746 CARRIER

10748 CARRIER

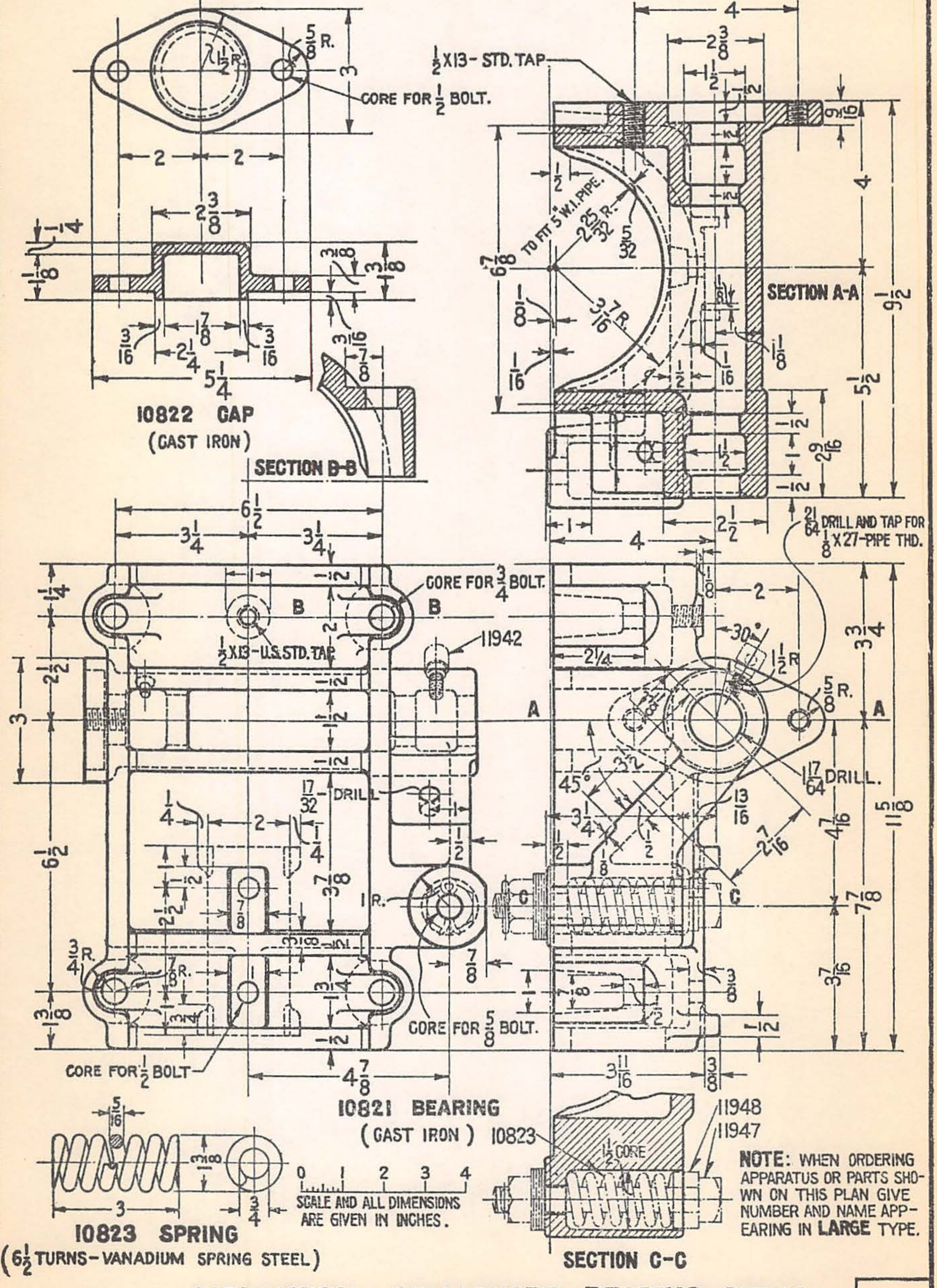
10749 CARRIER

ONE-WAY PIPE CARRIERS

M-1938	APR. 1938	M-1935	MAR. 1935

AAR
SIG. SEC.
1074B

Cast iron shall be in accordance with Specification for Gray Iron Castings. Malleable iron shall be in accordance with Specification for Malleable Iron Castings.



10822 CAP
(CAST IRON)
5/8 R.
7 1/2 R.
CORE FOR 1/2 BOLT.
3
2
2
2 3/8
1/4
1 1/8
3/8
3/16
1 7/8
2 1/4
5 1/4
SECTION B-B
7/8
1/2 X 13 - STD. TAP
4
2 3/8
1 1/2
1/2
9/16
TO FIT 5" W.I. PIPE.
2 25/32 R.
5/32
6 7/8
3 7/16 R.
1/16
1 1/8
SECTION A-A
9 1/2
5 1/2
2 9/16
2 1/2
21/64 DRILL AND TAP FOR 1/8 X 27-PIPE THD.
6 1/2
3 1/4
3 1/4
CORE FOR 3/4 BOLT.
B
B
1/2 X 13-U.S. STD. TAP
11942
A
A
30°
1 1/2 R
5/8 R.
1 17/64 DRILL.
45°
3 1/2
13/16
2 7/16
4 7/16
11 5/8
17/32 - DRILL
3 7/8
1 R.
C
C
7/8
3 7/16
3/4 R.
7/8 R.
CORE FOR 5/8 BOLT.
CORE FOR 1/2 BOLT
4 7/8
10821 BEARING
(CAST IRON)
3 11/16
3/8
11948
11947
10823
1 1/2 CORE
SECTION C-C
5/16
3
3/8
3/4
10823 SPRING
(6 1/2 TURNS-VANADIUM SPRING STEEL)
0 1 2 3 4
SCALE AND ALL DIMENSIONS ARE GIVEN IN INCHES.

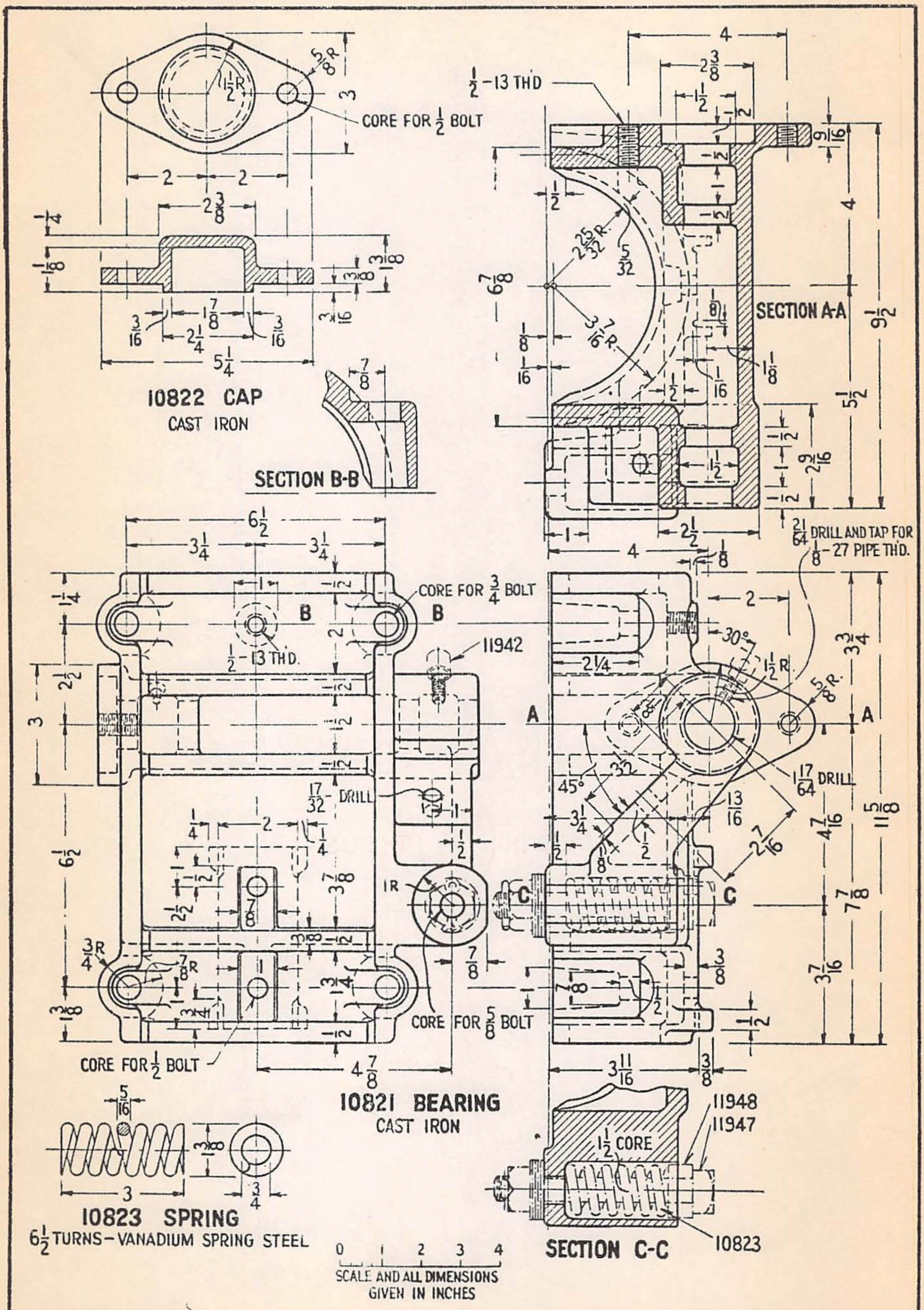
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

MECHANICAL SEMAPHORE BEARING—DETAILS

1082

MAR. 1920 | SEP. 1916 | M 5-1912 | DEC. 1911 | OCT. 1911 | OCT. 1910

See 1194 for further details and assembly.
Cast iron shall be in accordance with Specification for Gray Iron Castings.


10822 CAP
CAST IRON
1½R
⅝R
3
CORE FOR ½ BOLT
2
2
2⅜
¼
1⅛
⅜
1⅛
3/16
1⅞
2¼
3/16
5¼
SECTION B-B
⅞
½-13 THD
4
2⅜
1½
½
9/16
4
½
2 25/32 R.
5/32
6⅞
SECTION A-A
9½
3 7/16 R.
⅛
1⅛
1/16
5½
1½
2 9/16
1
2½
4
⅛
21/64 DRILL AND TAP FOR ⅛-27 PIPE THD.
6½
3¼
3¼
1¼
B
B
CORE FOR ¾ BOLT
11942
½-13 THD.
2½
3
A
A
30°
1½R.
⅝R.
3¾
17/32-DRILL
45°
1 17/64 DRILL
13/16
4 7/16
11⅝
6½
2 7/16
1R
C
C
7⅞
¾R
⅞R
3 7/16
1⅜
CORE FOR ½ BOLT
CORE FOR ⅝ BOLT
4⅞
10821 BEARING
CAST IRON
3 11/16
⅜
11948
11947
1½ CORE
10823
SECTION C-C
5/16
1⅜
3
¾
10823 SPRING
6½ TURNS-VANADIUM SPRING STEEL
0 1 2 3 4
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

MECHANICAL SEMAPHORE BEARING FOR 5-INCH MAST

DETAILS

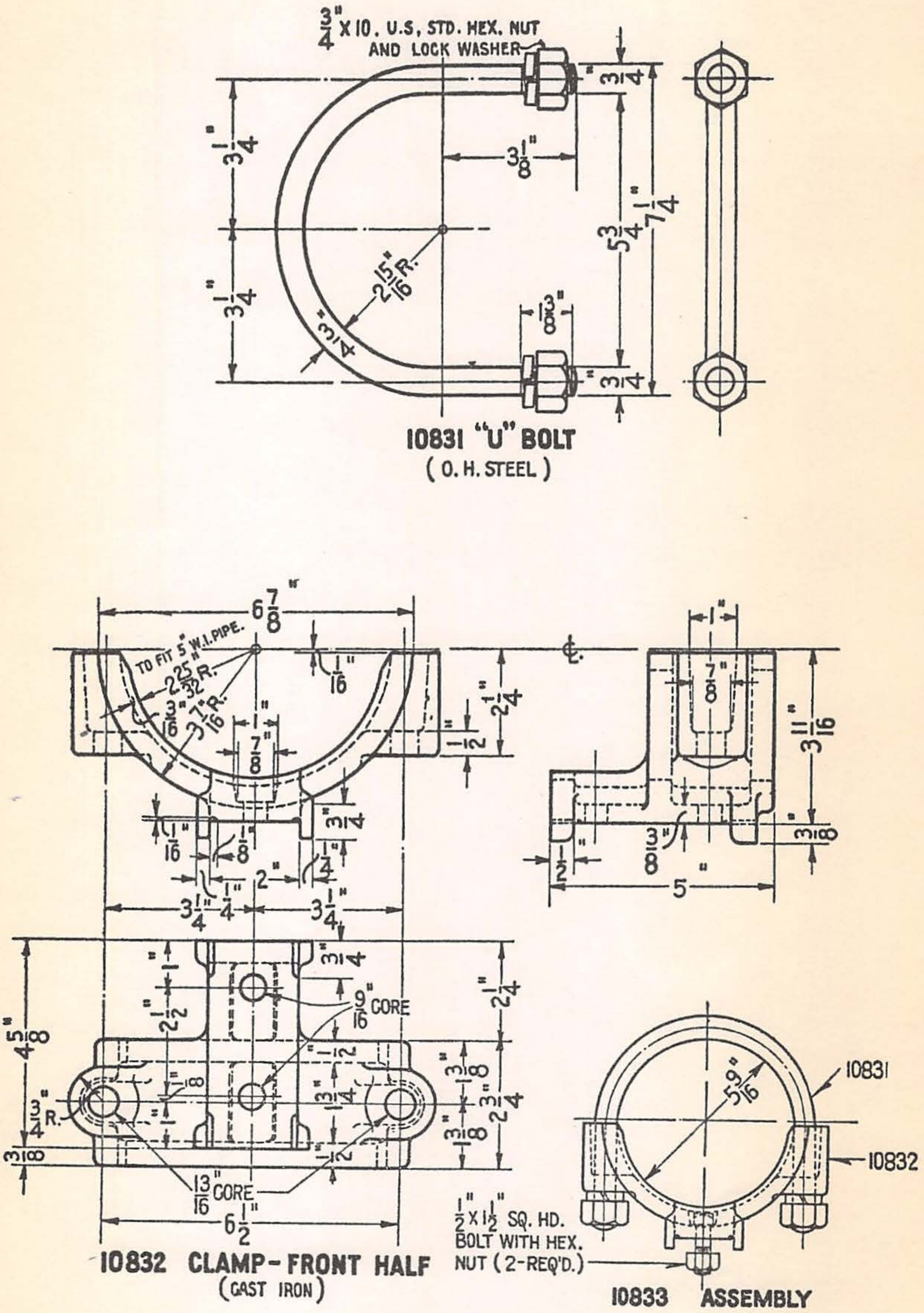
AAR
SIG. SEC.
1082B

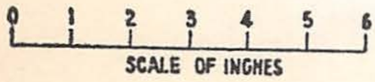
M-1946 | OCT.1946 | MAR.1920 | SEP. 1916 | M.5-1912 | DEC. 1911 | OCT 1911 | OCT 1910

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

PRINTED IN U. S. A.

SPECIFICATION DEPT.
FEB
12
1948


3/4" X 10. U.S. STD. HEX. NUT AND LOCK WASHER
3 1/4"
3 1/4"
3 1/8"
3/4"
5 3/4
7 1/4"
2 15/16" R.
3/4"
3/8"
3/4"
10831 "U" BOLT
(O.H. STEEL)
6 7/8"
TO FIT 5" W.I. PIPE.
2 25/32" R.
3/16"
3 7/16" R.
1"
7/8"
1/16"
2 1/4"
1/2"
3/4"
1/16"
1/8"
1/4"
1"
2"
3 1/4"
3 1/4"
1"
7/8"
3 11/16"
3/8"
3/8"
1/2"
5"
℄
3/4"
1"
2 1/2"
9/16" CORE
2 1/4"
4 5/8"
1/2"
1/8"
1 3/8"
1 3/4"
2 3/4"
3/4" R.
1"
1 3/8"
3/8"
1/2"
13/16" CORE
6 1/2"
10832 CLAMP-FRONT HALF
(CAST IRON)
5 9/16"
10831
10832
1/2" X 1 1/2" SQ. HD. BOLT WITH HEX. NUT (2-REQ'D.)
10833 ASSEMBLY


0
1
2
3
4
5
6
SCALE OF INCHES

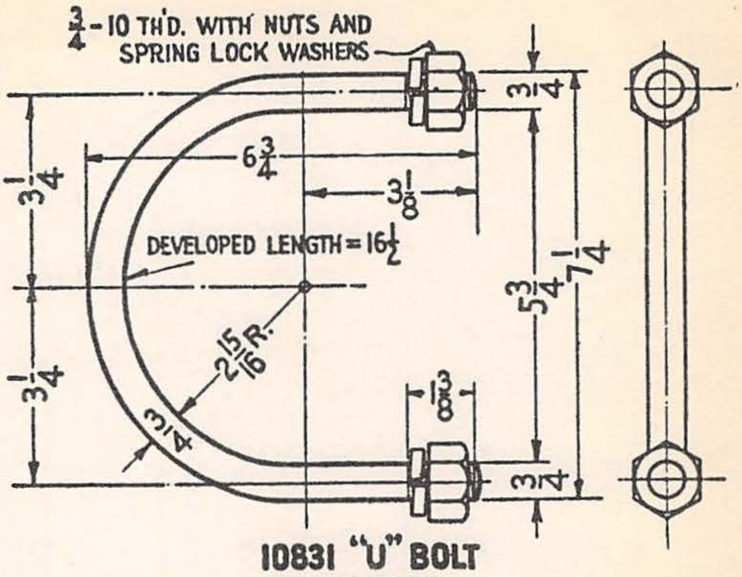
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

"U" BOLT AND CLAMP
(FOR SIGNAL MASTS)

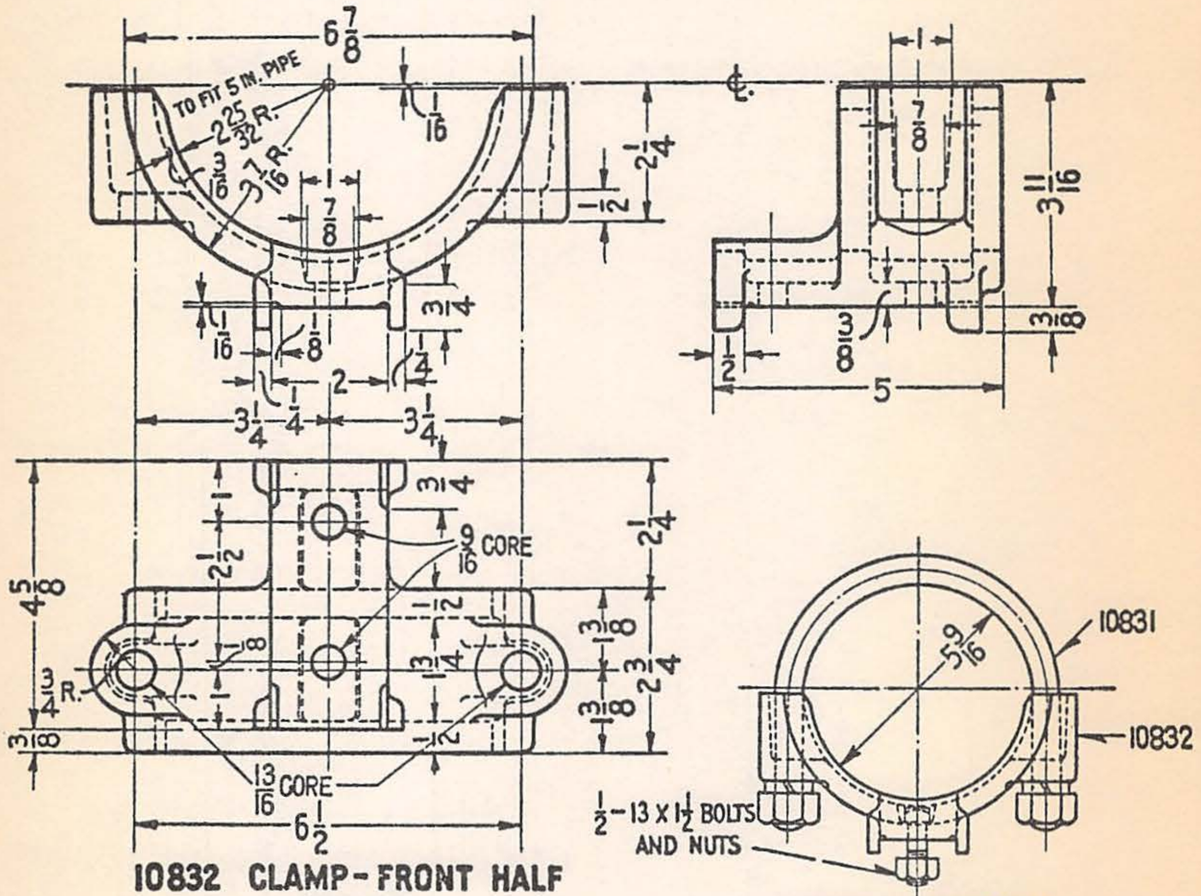
MANUAL-FEB.1914 OCT.1910

RSA 1083

See 1194 and 1238.
Cast iron shall be in accordance with Specification for Gray Iron Castings.


3/4 - 10 TH'D. WITH NUTS AND SPRING LOCK WASHERS
6 3/4
3 1/8
DEVELOPED LENGTH = 16 1/2
2 15/16 R.
3/4
3 1/4
3 1/4
3/8
3/4
3/4
5 3/4
7 1/4

10831 "U" BOLT
SAE-1020 STEEL


6 7/8
TO FIT 5 IN. PIPE
2 25/32 R.
3 7/16 R.
3/16
1/16
1
7/8
2 1/4
1/2
3/4
1/16
1/8
2
1/4
3 1/4
3 1/4
℄
1
7/8
3 11/16
3/8
3/8
1/2
5
4 5/8
3/4 R.
3/8
1
1 1/2
3/4
9/16 CORE
1/2
1/8
1 3/4
1/2
1 3/8
2 3/4
1 3/8
2 1/4
13/16 CORE
6 1/2
5 9/16
10831
10832
1/2 - 13 X 1 1/2 BOLTS AND NUTS

10832 CLAMP - FRONT HALF
CAST IRON

10833 ASSEMBLY

NOTE: FORMED BOLT SHALL BE PAINTED WITH PRIMING COAT OR GALVANIZED OR CADMIUM PLATED. STRAIGHT BOLT AND NUTS SHALL BE GALVANIZED OR CADMIUM PLATED. GALVANIZING OR CADMIUM PLATING SHALL BE DONE AFTER THREADS HAVE BEEN CUT AND BOLT FORMED.

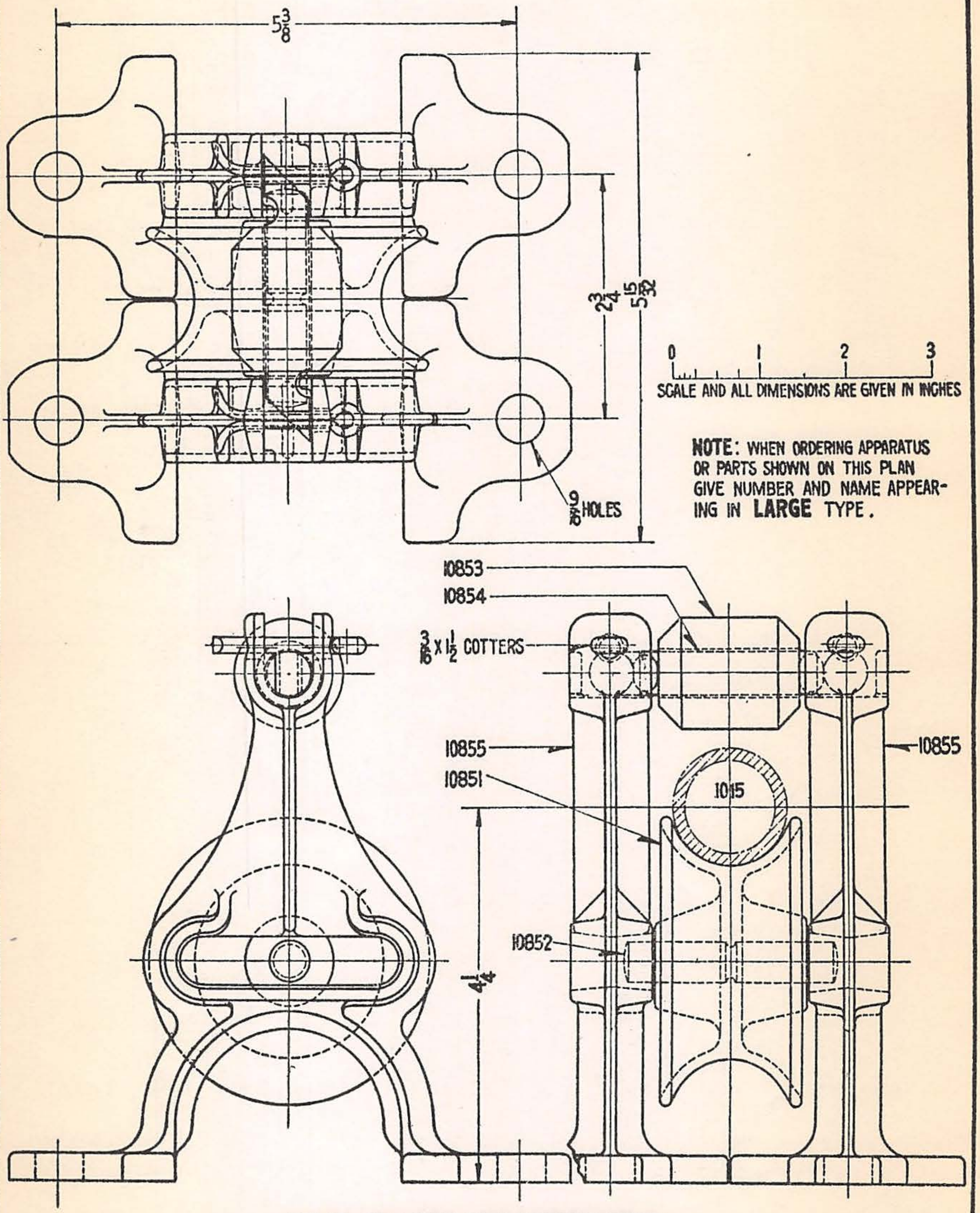
0 1 2 3 4 5 6
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

"U" BOLT AND CLAMP
FOR SIGNAL MASTS

M-1947 | SEP. 1947 | M-1945 | OCT. 1945 | MANUAL-FEB. 1914 | OCT. 1910

AAR
SIG. SEC.
1083C

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17; Painting shall be in accordance with Specification 120, Manual Part 110; Spring lock washers shall be carbon steel. (A.S.A. current Specification B27.1 preferred, where practicable.)


5 3/8
2 3/4
5 15/32
9/16 HOLES
10853
10854
3/16 X 1 1/2 COTTERS
10855
10851
1015
10852
4 1/4
10855

0 1 2 3

SCALE AND ALL DIMENSIONS ARE GIVEN IN INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

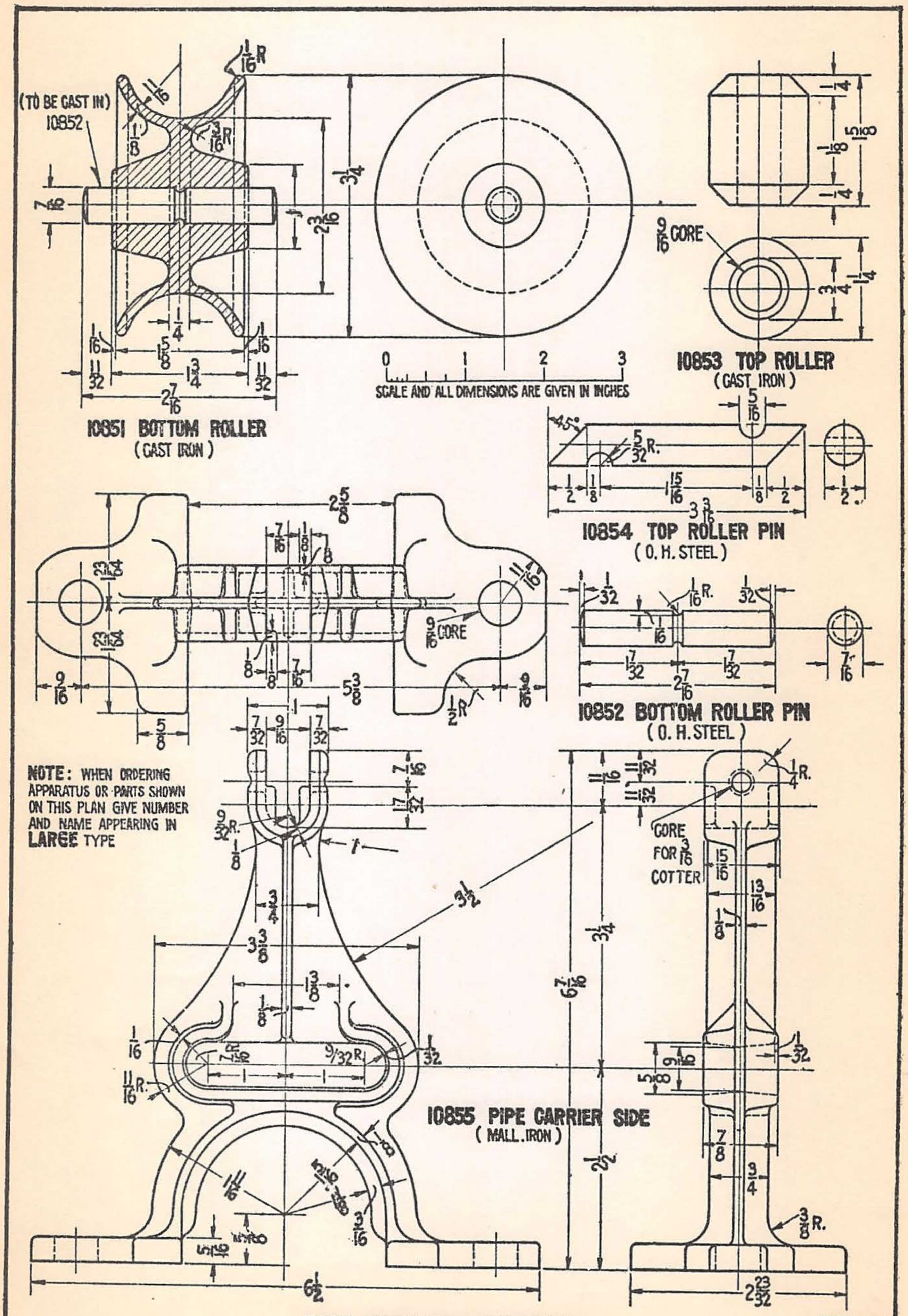
10841 ONE WAY PIPE CARRIER COMPL.

PIPE CARRIER — ASSEMBLY

(FOR DETAILS SEE NO. 1085)

						M-1928	MAR. 1928	MAR. 1920	OCT. 1913	JUN. 1913	JUN. 1912

ARA
SIG. SEC.
1084B



(TO BE CAST IN)
10852
10851 BOTTOM ROLLER
(CAST IRON)
SCALE AND ALL DIMENSIONS ARE GIVEN IN INCHES
$\frac{9}{16}$ CORE
10853 TOP ROLLER
(CAST IRON)
10854 TOP ROLLER PIN
(O. H. STEEL)
10852 BOTTOM ROLLER PIN
(O. H. STEEL)
CORE FOR $\frac{3}{16}$ COTTER
10855 PIPE CARRIER SIDE
(MALL. IRON)

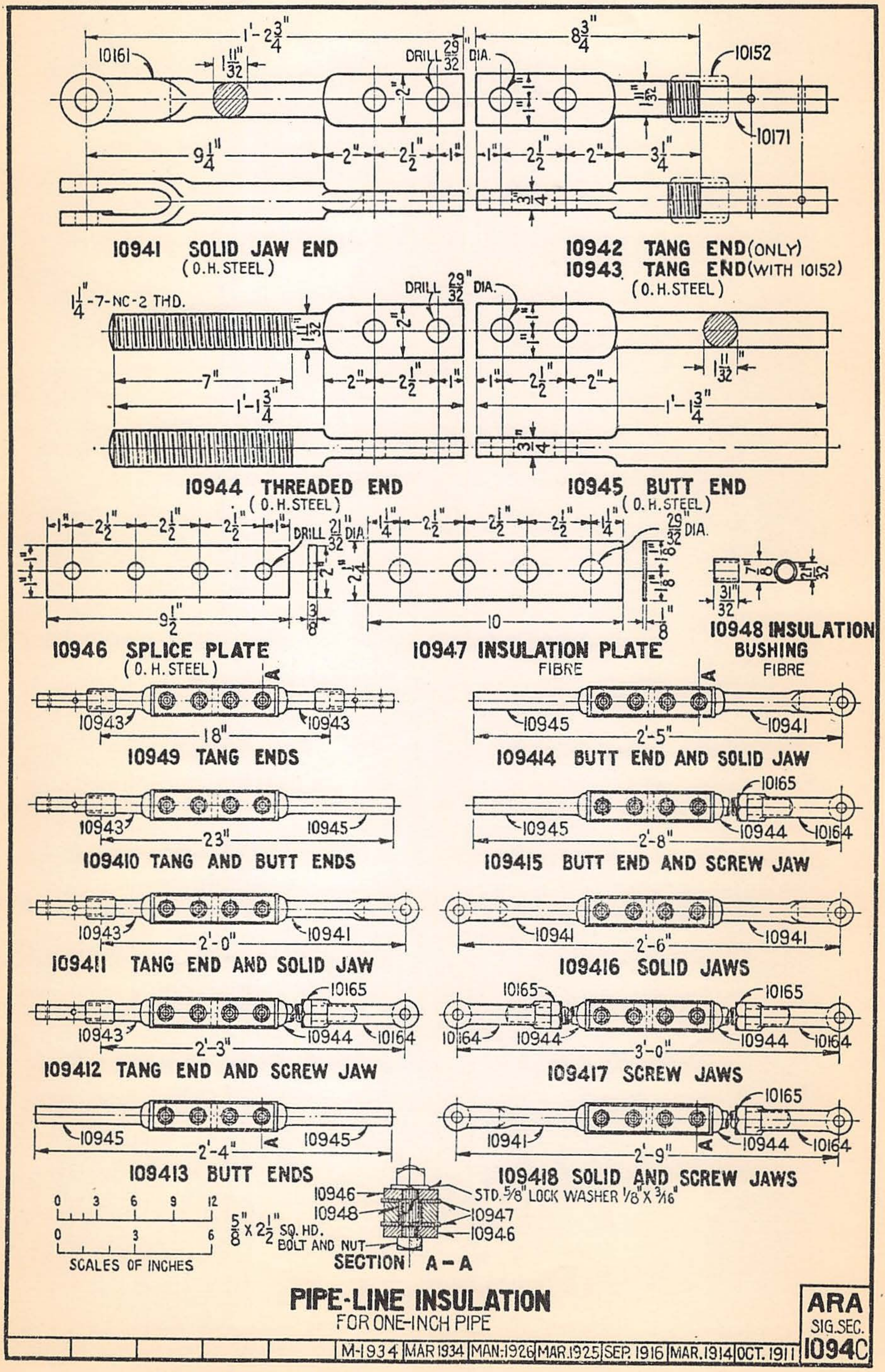
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE

PIPE CARRIER — DETAILS

M-1928	MAR. 1928	MAN'L 1925	MAR. 1924	NOV. 1923	MAR. 1920	JUN. 1913	JUN. 1912

ARA
SIG. SEC.
1085B

See 1084 for assembly.
Cast iron shall be in accordance with Specification for Gray Iron Castings.
Malleable iron shall be in accordance with Specification for Malleable Iron Castings.


10161
1'-2 3/4"
1 11/32"
DRILL 29/32" DIA.
8 3/4"
10152
10171
9 1/4"
2"
2 1/2"
1"
3 1/4"
3/4"
10941 SOLID JAW END
(O.H. STEEL)
10942 TANG END (ONLY)
10943 TANG END (WITH 10152)
(O.H. STEEL)
1 1/4"-7-NC-2 THD.
7"
1'-1 3/4"
10944 THREADED END
(O.H. STEEL)
10945 BUTT END
(O.H. STEEL)
DRILL 21/32" DIA.
29/32" DIA.
9 1/2"
3/8"
2 1/4"
1 1/4"
10
1/8"
7/8"
31/32"
21/32"
10946 SPLICE PLATE
(O.H. STEEL)
10947 INSULATION PLATE
FIBRE
10948 INSULATION BUSHING
FIBRE
A
18"
10949 TANG ENDS
2'-5"
109414 BUTT END AND SOLID JAW
23"
109410 TANG AND BUTT ENDS
10165
10164
2'-8"
109415 BUTT END AND SCREW JAW
2'-0"
109411 TANG END AND SOLID JAW
2'-6"
109416 SOLID JAWS
2'-3"
109412 TANG END AND SCREW JAW
3'-0"
109417 SCREW JAWS
2'-4"
109413 BUTT ENDS
2'-9"
109418 SOLID AND SCREW JAWS
10946
10948
5/8" X 2 1/2" SQ. HD. BOLT AND NUT
STD. 5/8" LOCK WASHER 1/8" X 3/16"
10947
10946
SECTION A–A
0 3 6 9 12
0 3 6
SCALES OF INCHES

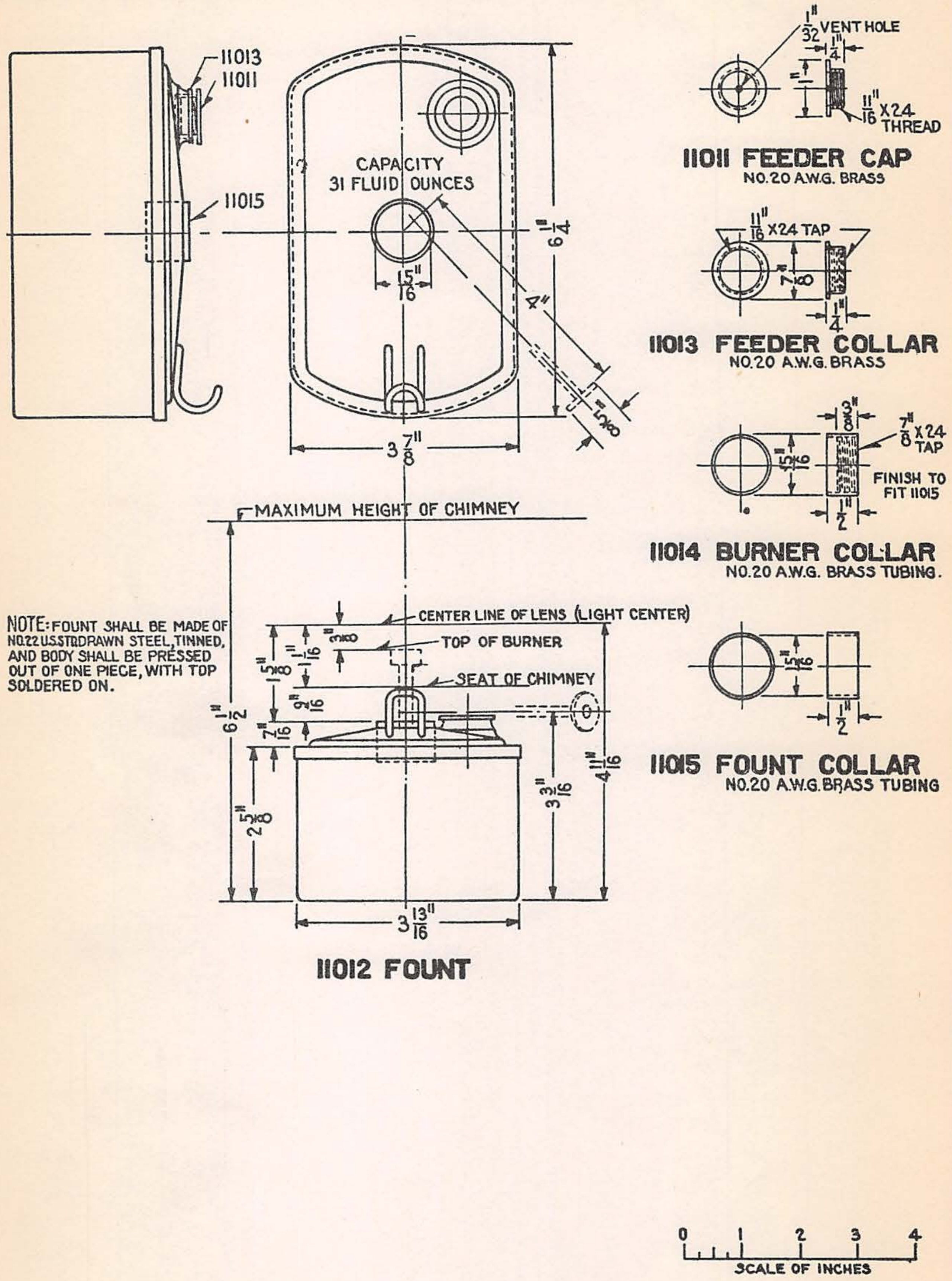
PIPE-LINE INSULATION

FOR ONE-INCH PIPE

M-1934	MAR 1934	MAN:1926	MAR.1925	SEP. 1916	MAR.1914	OCT. 1911

ARA
SIG.SEC.
1094C

Material shall be in accordance with Specification 13.


11013
11011
11015
CAPACITY 31 FLUID OUNCES
15/16"
4"
6 1/4"
5/8"
3 7/8"
1/32" VENT HOLE
1/4"
1"
11/16" X 24 THREAD
11011 FEEDER CAP
NO. 20 A.W.G. BRASS
11/16" X 24 TAP
7/8"
1/4"
11013 FEEDER COLLAR
NO. 20 A.W.G. BRASS
3/8"
7/8" X 24 TAP
15/16"
FINISH TO FIT 11015
1/2"
11014 BURNER COLLAR
NO. 20 A.W.G. BRASS TUBING.
15/16"
1/2"
11015 FOUNT COLLAR
NO. 20 A.W.G. BRASS TUBING
MAXIMUM HEIGHT OF CHIMNEY
CENTER LINE OF LENS (LIGHT CENTER)
TOP OF BURNER
SEAT OF CHIMNEY
3/8"
1 1/16"
1 5/8"
9/16"
7/16"
6 1/2"
2 5/8"
3 3/16"
4 11/16"
3 13/16"
11012 FOUNT
0 1 2 3 4
SCALE OF INCHES

NOTE: FOUNT SHALL BE MADE OF NO. 22 U.S.STD. DRAWN STEEL, TINNED, AND BODY SHALL BE PRESSED OUT OF ONE PIECE, WITH TOP SOLDERED ON.

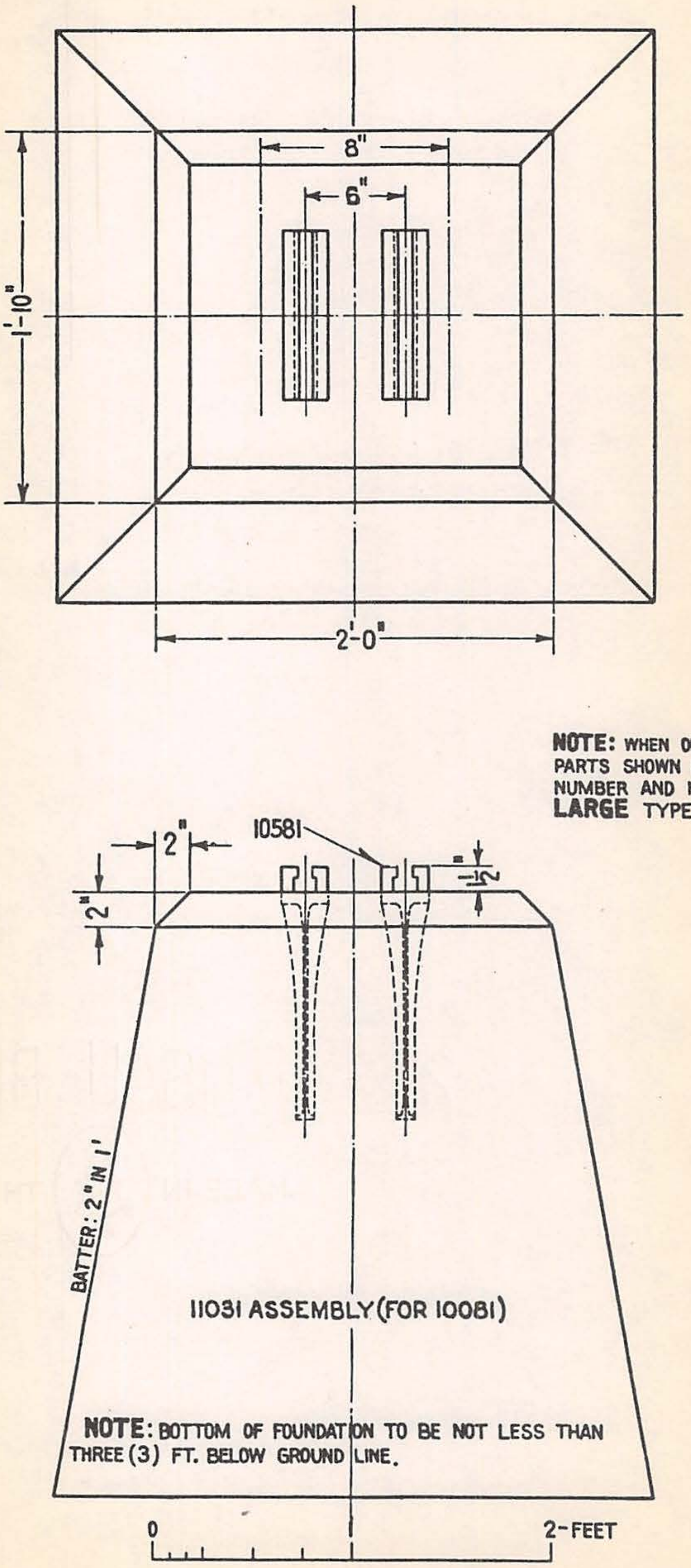
NOTE: MATERIAL SHALL BE IN ACCORDANCE WITH A.R.A. SIG. SEC. SPECIFICATION.

OIL FOUNT

ARA
SIG. SEC.
1101B

M-1926 | MAR. 1926 | SEP. 1925 | M. APR. 1914 | JUN 1910

Material shall be in accordance with Specification 137.


8"
6"
1'-10"
2'-0"
2"
10581
2"
1½"
BATTER: 2" IN 1'
11031 ASSEMBLY (FOR 10081)
0
2-FEET

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

NOTE: BOTTOM OF FOUNDATION TO BE NOT LESS THAN THREE (3) FT. BELOW GROUND LINE.

CONCRETE FOUNDATION FOR HORIZONTAL CRANK STANDS

ARA
SIG. SEC.
1103A

OCT. 1913 OCT. 1909

6

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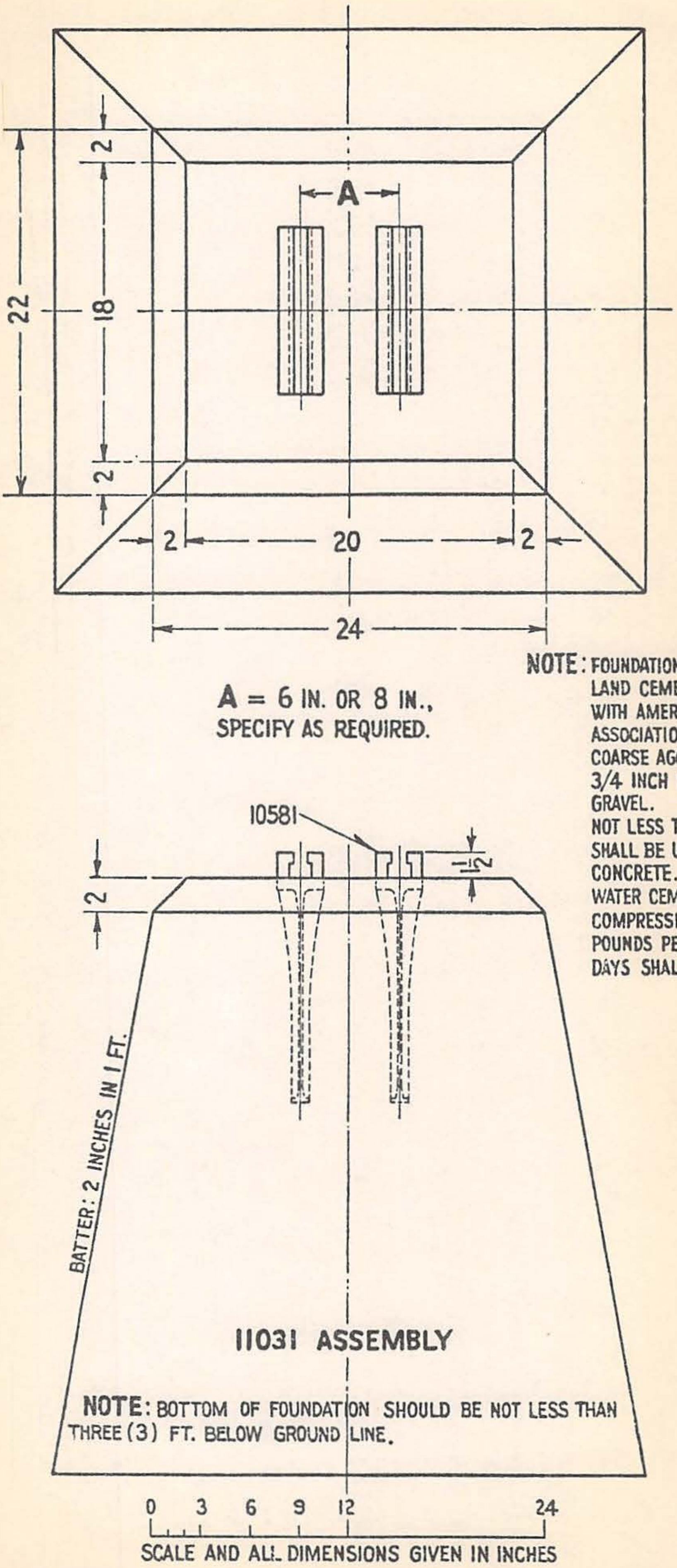
FEB
12
1948
SPECIFICATION DEPT.



A = 6 IN. OR 8 IN., SPECIFY AS REQUIRED.

NOTE: FOUNDATIONS SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.
COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.
NOT LESS THAN 564 LBS. OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 2500 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.

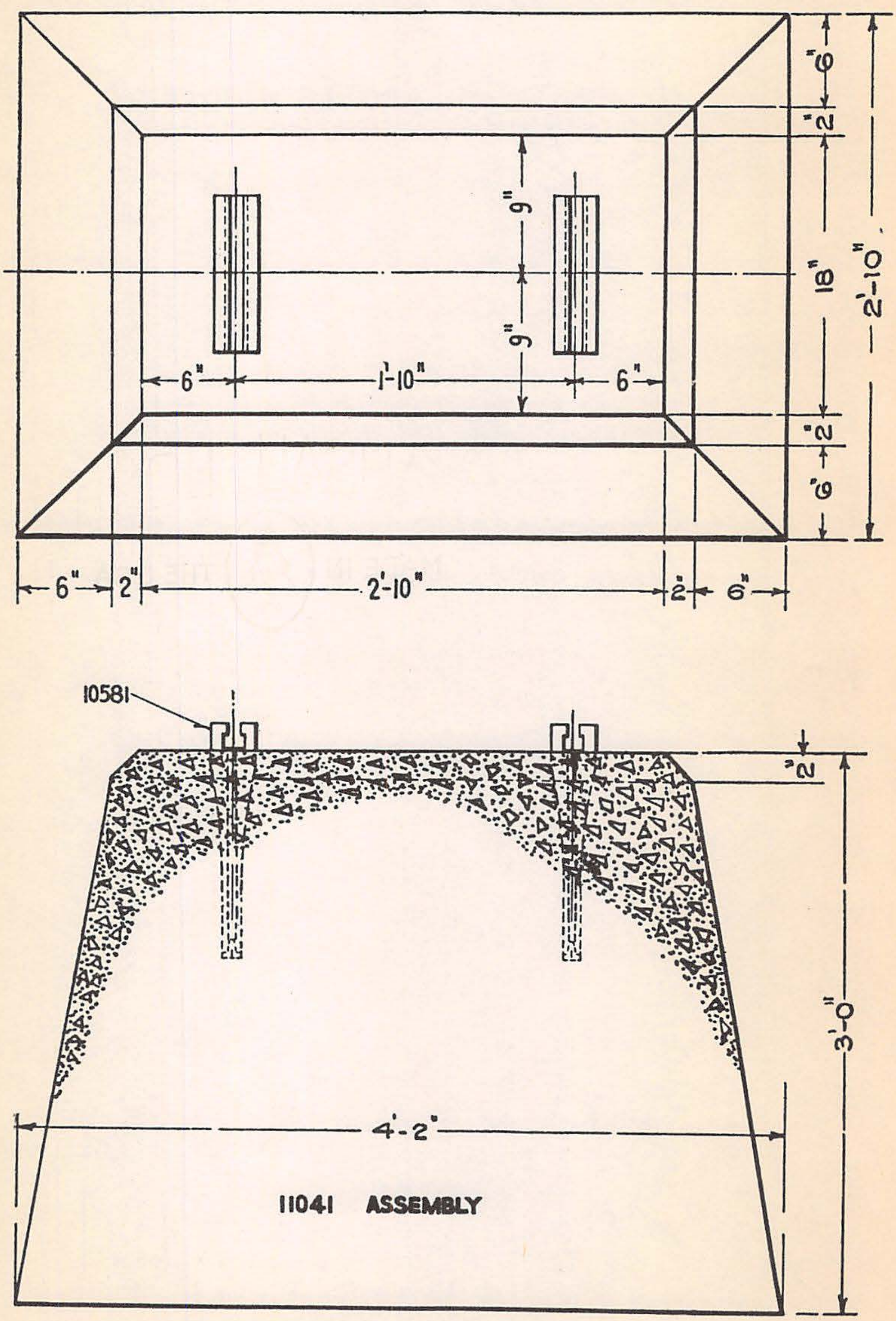
NOTE: BOTTOM OF FOUNDATION SHOULD BE NOT LESS THAN THREE (3) FT. BELOW GROUND LINE.

SCALE AND ALL DIMENSIONS GIVEN IN INCHES

CONCRETE FOUNDATION FOR HORIZONTAL CRANK STANDS

AAR
SIG. SEC.
1103 B

								M-1947	SEP. 1947	OCT. 1913	OCT. 1909


6"
2"
9"
18"
9"
2'-10"
2"
6"
6"
1'-10"
6"
6"
2"
2'-10"
2"
6"
10581
2"
3'-0"
4'-2"
11041 ASSEMBLY

FOUNDATION FOR COMPENSATOR.

MANUAL-MAR.1913 | OCT.1909 | RSA 1104

PRINTED IN U. S. A.

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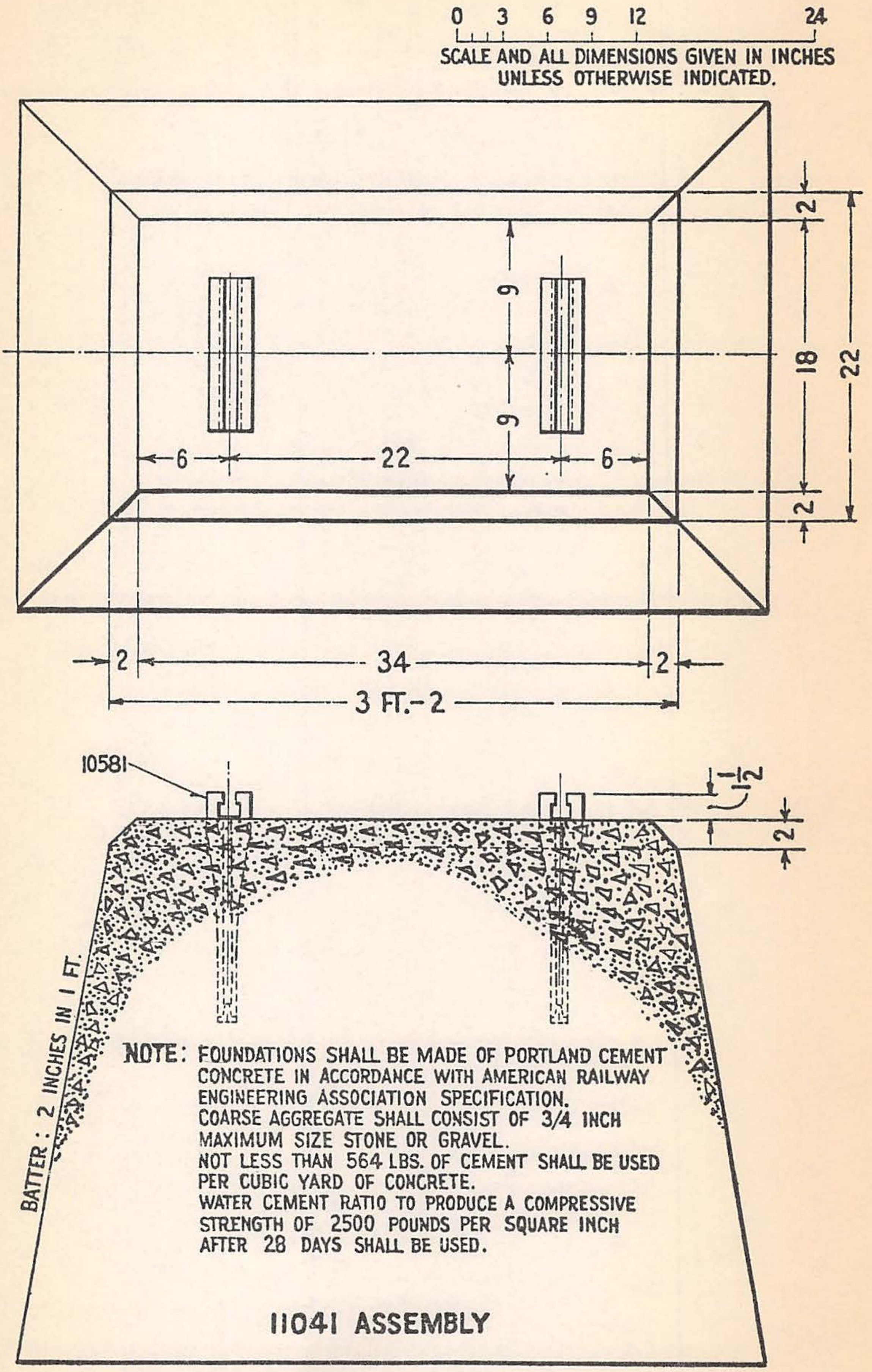
FEB 12 1948
SPECIFICATION DEPT.


0
3
6
9
12
24
SCALE AND ALL DIMENSIONS GIVEN IN INCHES UNLESS OTHERWISE INDICATED.
2
18
22
2
9
9
6
22
6
2
34
2
3 FT.-2
10581
1 1/2
2
BATTER: 2 INCHES IN 1 FT.

NOTE: FOUNDATIONS SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.
COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.
NOT LESS THAN 564 LBS. OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 2500 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.

11041 ASSEMBLY

NOTE: BOTTOM OF FOUNDATION SHOULD BE NOT LESS THAN THREE (3) FT. BELOW GROUND LINE.

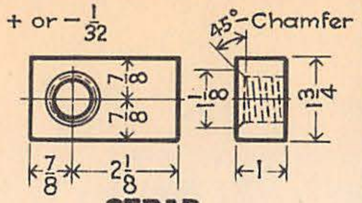
FOUNDATION FOR COMPENSATOR.

M-1947 | SEP. 1947 | MANUAL-MAR.1913 | OCT.1909

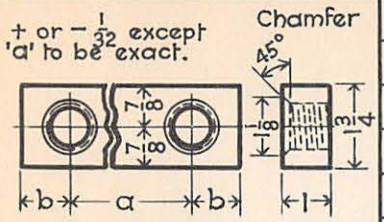
AAR
SIG. SEC.
1104B

PRINTED IN U. S. A.

Plan rev'd 11-11-40
and renumbered
1141 Issue: 1 (11-11-40)
was old 801, Issue 2
of 8-21 1936

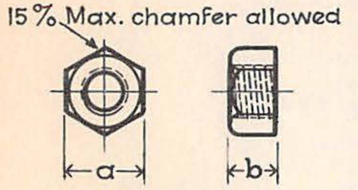


STRAP



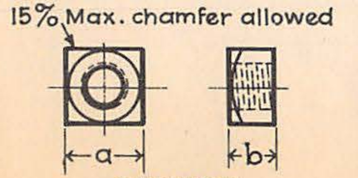
STRAP

15% Max. chamfer allowed



HEXAGON

15% Max. chamfer allowed



SQUARE

ORDER NUMBER	REF. ON GRS PLAN 52600	DIMENSIONS				FOR ASSEMBLING
		DIAM OF BOLT	THD. PER INCH	a	b	
1141-1	73	1	8			Rail clip bolts - wood tie
1141-10	72	1	8	$2\frac{9}{16}$	$\frac{31}{32}$	Chair and rail clip bolts - steel tie — Outside of far rail from mechanism
1141-11	70	1	8	$3\frac{1}{16}$	$\frac{31}{32}$	Chair and rail clip bolts - steel tie — Outside of near rail and gauge side of far rail from mechanism
1141-12	71	1	8	$3\frac{3}{16}$	$\frac{29}{32}$	Chair and rail clip bolts - steel tie — Gauge side of near rail to mechanism
1141-13	59	1	8	$4\frac{1}{4}$	$\frac{7}{8}$	Steel tie through bolts
1141-20	49	2	8	$3\frac{1}{8}$	2	Stud pins in bearing for lever in crank and angle bars; and operating bar in lever
1141-21	50	2	8	$3\frac{1}{8}$	$1\frac{1}{8}$	
1141-22	54	1	8	$1\frac{1}{2}$	$\frac{7}{8}$	
1141-23	63 112	$\frac{3}{4}$	10	$1\frac{1}{4}$	$\frac{3}{4}$	
1141-24	114	$\frac{1}{2}$	13	$\frac{7}{8}$	$\frac{1}{2}$	For 'U' bolt fastening leaf springs to shoe beams
1141-25	114	$\frac{3}{8}$	16	$\frac{11}{16}$	$\frac{23}{64}$	
1141-26	Z	3	$3\frac{1}{2}$	$4\frac{5}{8}$	$1\frac{3}{4}$	
1141-27	X	$2\frac{1}{2}$	4	$3\frac{7}{8}$	$1\frac{1}{2}$	
1141-28		$1\frac{1}{4}$	7	2	$1\frac{1}{4}$	
1141-40	69	1	8	$1\frac{1}{2}$	$\frac{7}{8}$	
1141-41	64	$1\frac{1}{4}$	7	2	$1\frac{1}{4}$	
1141-42		$\frac{3}{4}$	10	$1\frac{1}{4}$	$\frac{3}{4}$	

SPECIFICATION

Nuts shall be of material capable of developing the full strength of the nickel steel bolts shown on Plan No. 1142 up to the yield point without stripping the threads of the bolt or nut.

One strip test shall be made from each lot.

If the results of the strip test do not conform to the requirements, two additional tests shall be made from such lot. Failure of these to meet the requirements rejects such lot.

All nuts cadmium plated: .0004"—.0005".

Threads: NC-2.

Square and hexagon nuts shall be hot forged, cold trimmed, normalized, chamfered and faced.

Not to scale
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

NUTS
FOR G.R.S. TYPE-B CAR RETARDER BOLTS

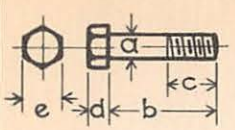
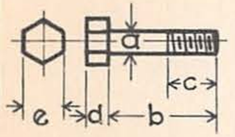
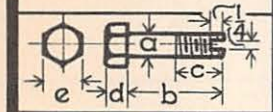
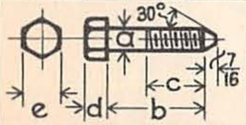
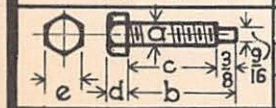
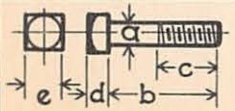
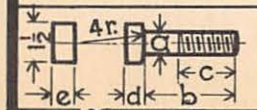
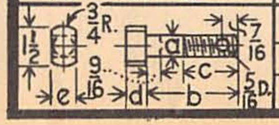
N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

1141

1 1-23-1941

Approved by Representatives of Lines shown.
Chairman

Plan revd. 11-13-40 and renumbered 1142 Issue: 1 (11-13-40) was old 802 Issue: 1 of 9-8-1933.

	ORDER NUMBERS		DIAM. OF BOLT (a)	THDS. PER INCH	DIMENSIONS				FOR ASSEMBLING
	NICKEL STEEL	O.H.STEEL			b	c	d	e	
	1142-1		1	8	3	1	21/32	1½	Chair to steel tie
	1142-2		"	"	3½	1½	"	"	Fixed lever bracket to tie bar
		1142-203	"	"	4¼	2½	"	"	Lower bearing bracket to angle bar
		1142-204	"	"	5	1½	"	"	Crank bar and spacer to steel tie *
	1142-4		"	"	"	"	"	"	Floating lever bracket to cross bar
		1142-206	"	"	2¾	1¼	"	"	Angle bar to steel tie *
		1142-207	"	"	5	1⅛	"	"	Crank bar and spacer to steel tie *
		1142-208	"	"	4	2⅜	"	"	Floating lever bracket to cross bar
	1142-8		"	"	"	"	"	"	Upper half rocker type fixed lever bracket to tie bar
		1142-210	1½ MAX.	6	5⅛	1¾	1	2¼	Link to operating bar
		1142-211	⅝	11	¾	⅝	27/64	15/16	Shims to angle bar
	1142-12		¾	10	2	1½	½	1⅛	Upper and lower halves of rocker type fixed lever brackets to tie bar
	1142-20		1	8	2¼	1⅛	⅝	1½	Fixed lever bracket to tie bar
	1142-21		"	"	3¾	1⅜	"	"	Rail clip to steel tie. – Chair to steel tie
		1142-222	1 MAX.	"	6¼	1½	21/32	"	Upper bearing bracket and spacer to steel tie *
		1142-223	"	"	3½	"	"	"	Upper bearing bracket to crank bar
		1142-224	"	"	3	"	"	"	Lower mechanism case casting to mechanism case channel
		1142-225	$1^{+.000}_{-.002}$	"	2¾	"	"	"	Mechanism to angle bar
	1142-26		1	"	5	"	½	"	Floating lever brackets to cross bars
	1142-30		¾	10	2	1¼	½	1⅛	Shoe to shoe beam - Selkirk only.
		1142-240	1	8	13⅛	1¾	21/32	1½	Top crank bar, spacer, angle bar, steel tie
		1142-241	"	"	17½	"	"	"	Upper bear. bkt., top crank bar, spacer, ang. bar, steel tie, 4" wood tie
		1142-242	1 MAX.	"	14⅜	"	"	"	Upper bear. bkt, top crank bar, spacer, angle bar, steel tie
	**1142-51		¾	10	3¼	2⅞	½	1⅛	Fixed lever pin to fixed lever bracket
		1142-261	1	8	10½	2½	21/32	1½	Mechanism to wood ties
		1142-262	"	"	5½	2¼	"	"	Lower bearing bracket to angle bar
		1142-263	1¼	7	18	3	27/32	1⅞	Top crank bar, angle bar to wood tie
	1142-70		¾	10	2½	1½	½	¾	Shoe to shoe beam
 1½ 3/4 R. 9/16 a 7/16 c e d b 5/16 D.	1142-75		¾	10	6½	2½	½	¾	T-Head shoe bolt (Square shank)

SPECIFICATIONS

FOR O. H. STEEL BOLTS

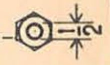
Cadmium plate: .0004"-.0005", Threads: NC-2.

FOR NICKEL STEEL BOLTS

Bolts shall be made from nickel steel heat treated material meeting the requirements of the A.S.T.M. standard specification A96-27 for alloy steel bolting material meeting the following requirements:

Tensile strength, Lbs. per sq. in.----125 000
Yield point, Lbs. per sq. in.--------105 000
Elongation in 2 ins., per cent----------16
Reduction of area, per cent----------50
Brinell hardness number--------260-320

Identification mark: on top of head, a circle, thus:---



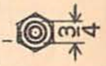
Cadmium plate: .0004"-.0005", Threads: NC-2.

FOR CHROME NICKEL STEEL BOLTS

Bolts shall be heat treated to provide the following requirements

Tensile strength, Lbs. per sq. in.---220 000
Yield point, Lbs. per sq. in.--------200 000
Elongation in 2 ins., per cent----------12
Reduction of area, per cent----------38
Brinell hardness number--------350-420

Identification mark: on top of head, 2 circles, thus:--



Cadmium plate: .0004"-.0005", Threads: NC-2.

NOTES:

* Where through bolts are not used.

** Chrome nickel steel.

Not to scale
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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M.C.R.R.
C.C.C.& ST.L RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

1142

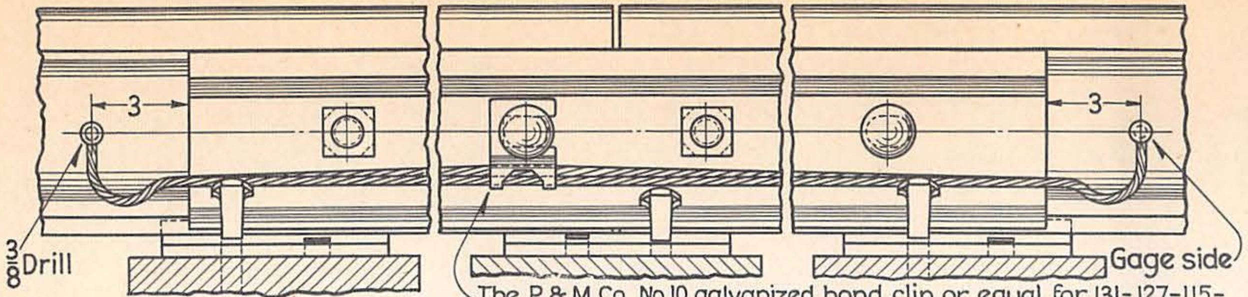
1 | 1-23-1941

BOLTS
FOR G.R.S. TYPE-B CAR RETARDERS

Approved by Representatives of Lines shown.

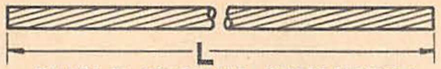
Chairman

1156 (2-10-1939)
Supersedes NYC S-G2A
1156B (7-23-1942)
Bond 1156-45 and-46 added
Table 2, 3 wire bond made
7, same as Table 3 etc.



3
3
3/8 Drill
Gage side
The P. & M. Co., No.10 galvanized bond clip or equal, for 131-127-115-112-105 lb. rail—to be placed on one of the two middle bolts.

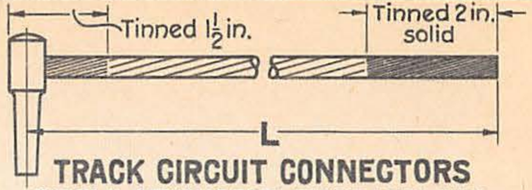
APPLICATION OF RAIL BOND AND CLIP



SINGLE STRAND CONDUCTOR

WIRES IN EACH STRAND 7-ANNEALED 40% COPPER-COVERED STEEL		
Diameter each wire—.081 in. " " strand—.243 in. Length of strand lay—2.75 in.		
ORDER NO.	**USE**	**L**
1156-61	Oil unloading siding	Specify length reqd.

TABLE 5

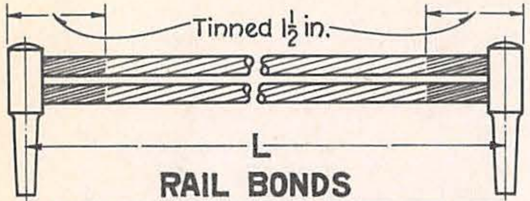


TRACK CIRCUIT CONNECTORS
SINGLE CONDUCTOR-BUTT WELDED
TABLE 4

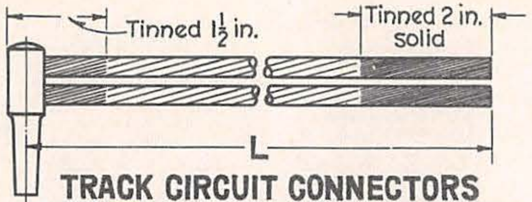
WIRES IN EACH STRAND
7-ANNEALED 40 %
COPPER-COVERED STEEL

Diameter each wire—.081 in.
" " strand—.243 in.
Length of strand lay—2.75 in.

ORDER NO.	USE	(IN.) L	(FT.)
1156-52	Oil unloading siding	36	3-0
1156-53	" " "	60	5-0



RAIL BONDS
DUPLEX CONDUCTOR-BUTT WELDED



TRACK CIRCUIT CONNECTORS
DUPLEX CONDUCTOR-BUTT WELDED

TABLE 1

WIRES IN EACH STRAND
1-ANNEALED COPPER AND
6-GALVANIZED STEEL

Diameter each wire—.077 in.
" " strand—.231 in.
Length of strand lay-2.54 in.

TABLE 2

WIRES IN EACH STRAND
7-ANNEALED 40%
COPPER-COVERED STEEL

Diameter each wire—.081 in.
" " strand—.243 in.
Length of strand lay—2.75 in.

ORDER NO.	USE	(IN.) L	(FT.)	ORDER NO.
1156-1	Frogs, switch points, etc.	25	2-1	1156-21
1156-2	24 in. joint bar	34	2-10	1156-22
1156-3	26 in. " "	36	3-0	1156-23
1156-4	36 in. " "	46	3-10	1156-24
1156-5	38 in. " "	48	4-0	1156-25
1156-6	40 in. " "	50	4-2	1156-26
1156-7	Oil unloading siding	72	6-0	1156-27
1156-8	Fouling circuit conn'n.	144	12-0	1156-28
1156-9	Frogs, etc.	180	15-0	1156-29
1156-10	Frogs, etc.	276	23-0	1156-30
1156-11	Frogs, etc.	312	26-0	1156-31

TABLE 3

WIRES IN EACH STRAND
7-ANNEALED 40%
COPPER-COVERED STEEL

Diameter each wire—.081 in.
" " strand—.243 in.
Length of strand lay—2.75 in.

ORDER NO.	USE	(IN.) L	(FT.)
1156-41	Rail connection	25	2-1
1156-42	Fouling circuit conn'n.	34	2-10
1156-43	" " "	46	3-10
1156-44	" " "	102	8-6
1156-45	Switch shunting circuit	72	6-0
1156-46	" " "	132	11-0

NOTES:

1. Plugs, bonds and connectors shall be in accordance with A.A.R.- S.S. Specification.
2. Plugs shall be driven through the web of rail to within 3/16 in. of the shoulder with a 2½ lb. hammer. Plug must be driven from same side hole is drilled.
3. Copper-covered steel bonds and connectors may be used at locations where the use of No-Ox-Id, etc. is insufficient to prevent corrosion.

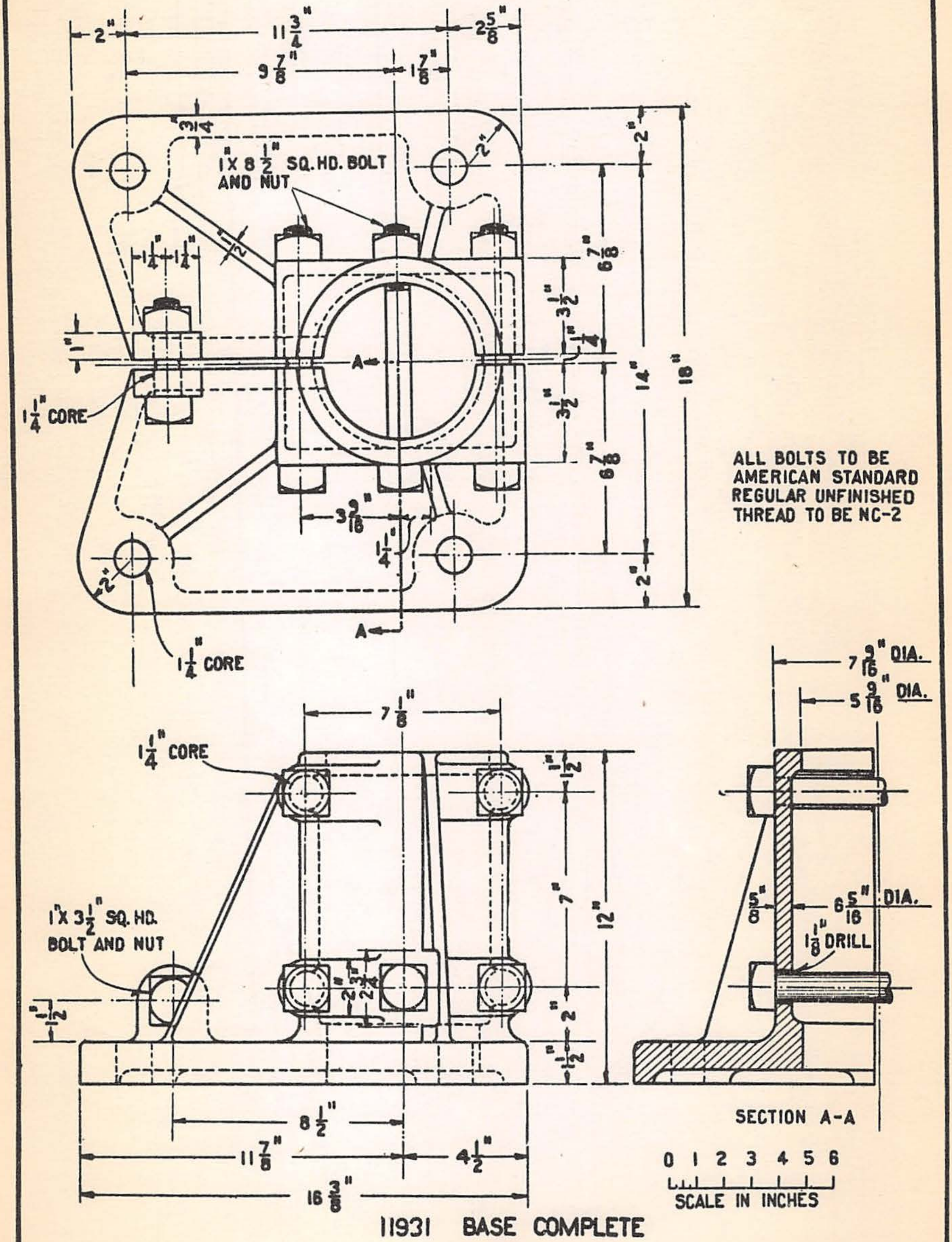
NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

1156B
2-10-1939
7-23-1942

PLUG TYPE RAIL BONDS AND TRACK CIRCUIT CONNECTORS

Approved by Representatives of Lines shown.
Chairman


2"
11 3/4"
2 5/8"
9 7/8"
1 7/8"
3/4"
1" X 8 1/2" SQ. HD. BOLT AND NUT
2"
1/2"
1 1/4" 1 1/4"
1"
6 7/8"
3 1/2"
1/4"
1 1/4" CORE
A
14"
18"
3 1/2"
6 7/8"
3 9/16"
1 1/4"
2"
2"
A
1 1/4" CORE
7 1/8"
1 1/4" CORE
1 1/2"
7"
12"
1" X 3 1/2" SQ. HD. BOLT AND NUT
2 3/4"
1 1/2"
2"
1 1/2"
8 1/2"
11 7/8"
4 1/2"
16 3/8"
7 9/16" DIA.
5 9/16" DIA.
5/8"
6 5/16" DIA.
1 1/8" DRILL
SECTION A-A
0 1 2 3 4 5 6
SCALE IN INCHES

ALL BOLTS TO BE AMERICAN STANDARD REGULAR UNFINISHED THREAD TO BE NC-2

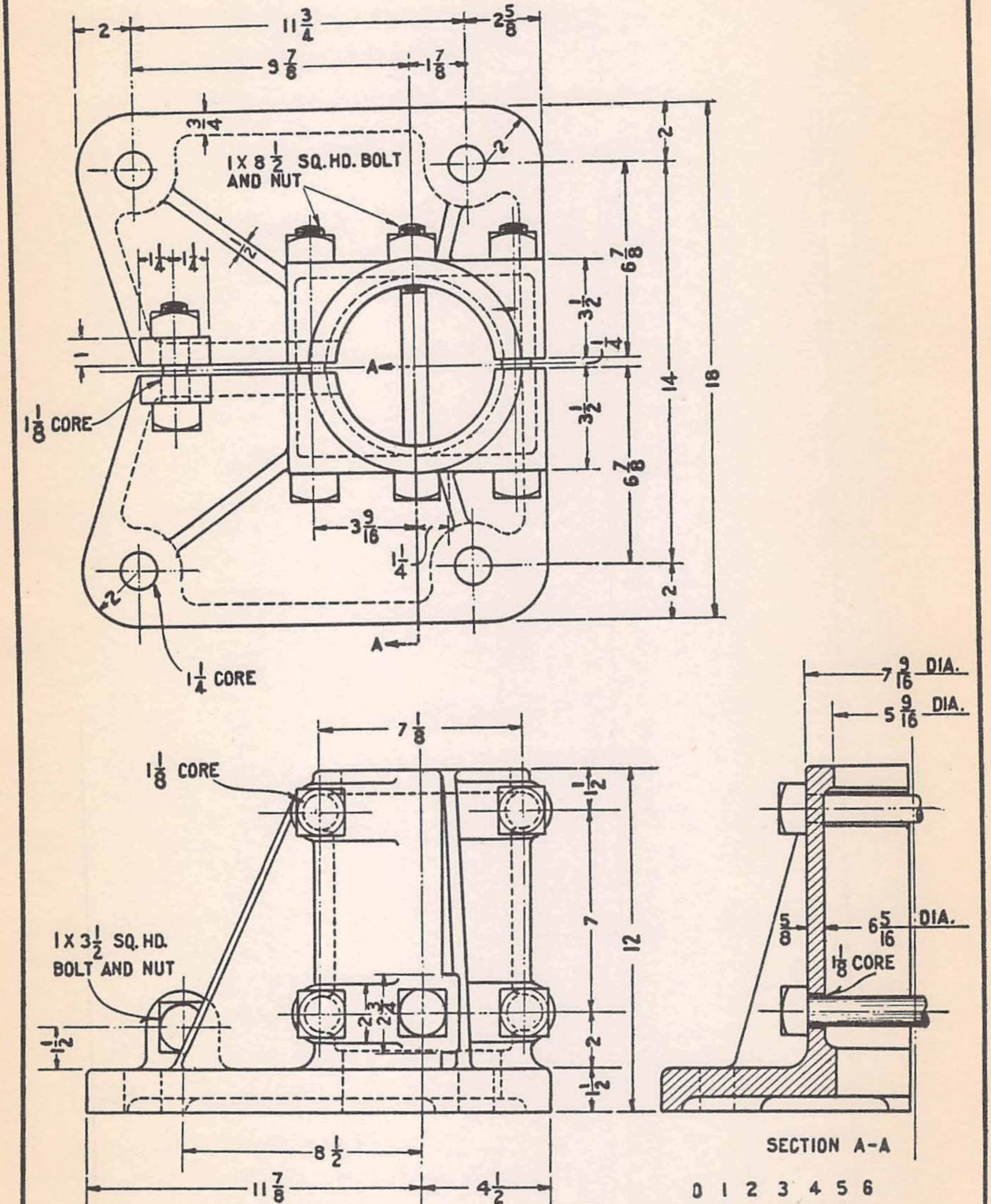
11931 BASE COMPLETE
CAST IRON

SUSPENSION BASE FOR 5-INCH MAST

AAR
SIG. SEC.
1193A

M-1936 MAR 1936

Cast iron shall be in accordance with Specification for Gray Iron Castings.



2
11 3/4
2 5/8
9 7/8
1 7/8
3/4
1 X 8 1/2 SQ. HD. BOLT AND NUT
2
1/2
1 1/4
1 1/4
1
1 1/8 CORE
A
3 1/2
1/4
3 1/2
6 7/8
6 7/8
14
18
2
2
3 9/16
1 1/4
1 1/4 CORE
A
7 9/16 DIA.
5 9/16 DIA.
7 1/8
1 1/8 CORE
1 1/2
7
12
1 X 3 1/2 SQ. HD. BOLT AND NUT
1 1/2
2 3/4
2 3/4
2
1 1/2
5/8
6 5/16 DIA.
1 1/8 CORE
8 1/2
11 7/8
4 1/2
16 3/8
SECTION A-A
0 1 2 3 4 5 6
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

11931 BASE COMPLETE

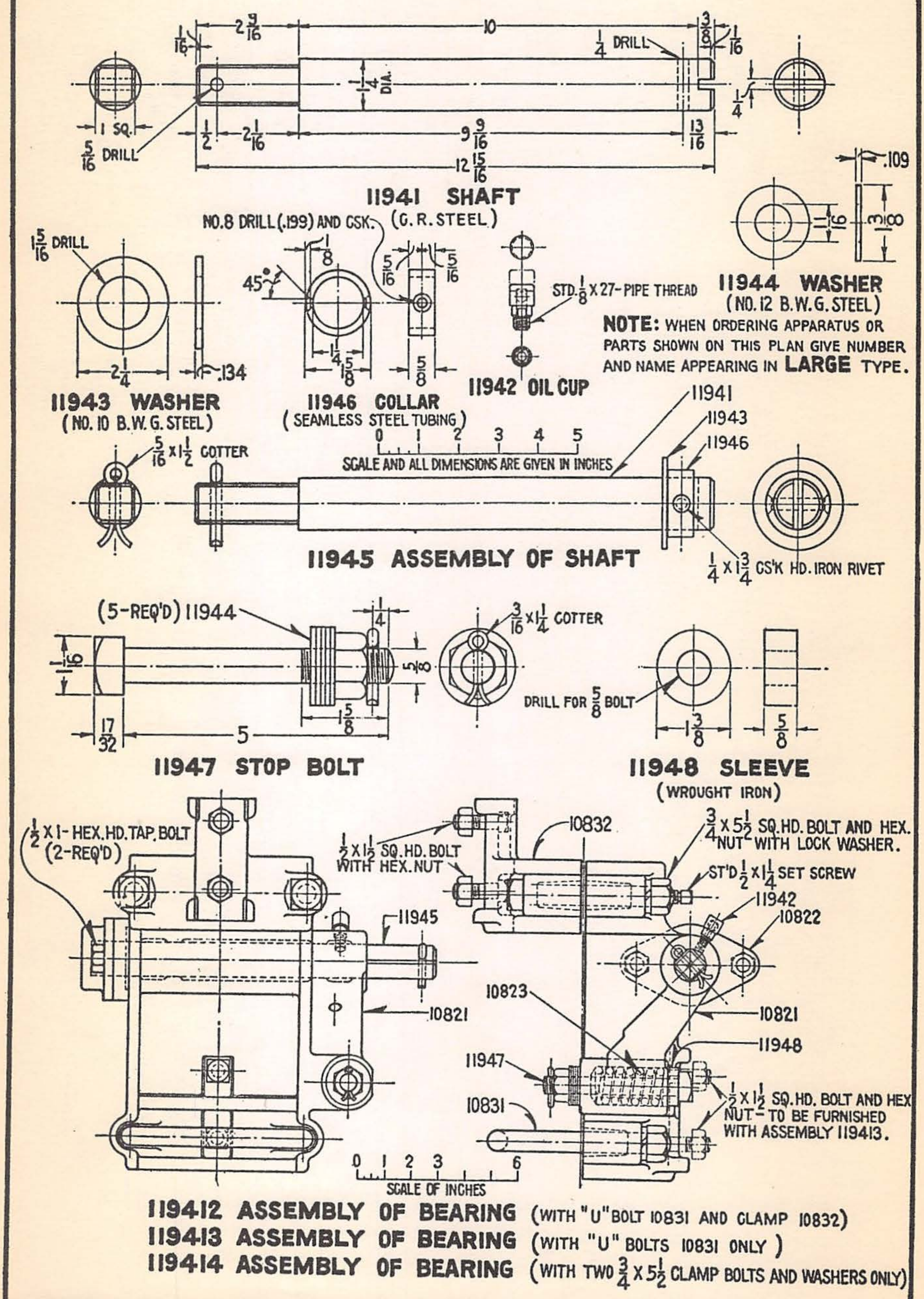
CAST IRON

SUSPENSION BASE FOR 5-INCH MAST

AAR SIG. SEC. 1193B

M-1941 SEP. 1941 M-1936 MAR 1936

Cast iron shall be in accordance with Specification for Gray Iron Castings.


1/16
2 9/16
10
3/8
1/16
1/4 DRILL
1 1/4 DIA.
1 SQ.
5/16 DRILL
1/2
2 1/16
9 9/16
13/16
1/4
12 15/16
.109
11941 SHAFT
(C.R. STEEL)
NO.8 DRILL (.199) AND CSK.
1 5/16 DRILL
45°
1/8
5/16
5/16
1 1/4
1 5/8
5/8
2 1/4
.134
STD. 1/8 X 27-PIPE THREAD
1 1/16
3/8
11944 WASHER
(NO. 12 B.W.G. STEEL)
11943 WASHER
(NO. 10 B.W.G. STEEL)
11946 COLLAR
(SEAMLESS STEEL TUBING)
11942 OIL CUP
0 1 2 3 4 5
SCALE AND ALL DIMENSIONS ARE GIVEN IN INCHES
11941
11943
11946
5/16 X 1 1/2 COTTER
11945 ASSEMBLY OF SHAFT
1/4 X 1 3/4 CS'K HD. IRON RIVET
(5-REQ'D) 11944
1/4
1 1/16
5/8
3/16 X 1 1/4 COTTER
17/32
5
1 5/8
DRILL FOR 5/8 BOLT
1 3/8
5/8
11947 STOP BOLT
11948 SLEEVE
(WROUGHT IRON)
1/2 X 1-HEX.HD.TAP.BOLT (2-REQ'D)
1/2 X 1 1/2 SQ.HD.BOLT WITH HEX.NUT
10832
3/4 X 5 1/2 SQ.HD. BOLT AND HEX. NUT WITH LOCK WASHER.
ST'D 1/2 X 1 1/4 SET SCREW
11942
10822
11945
10821
10823
10821
11948
11947
10831
1/2 X 1 1/2 SQ.HD. BOLT AND HEX NUT – TO BE FURNISHED WITH ASSEMBLY 119413.
0 1 2 3 6
SCALE OF INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

119412 ASSEMBLY OF BEARING (WITH "U" BOLT 10831 AND CLAMP 10832)

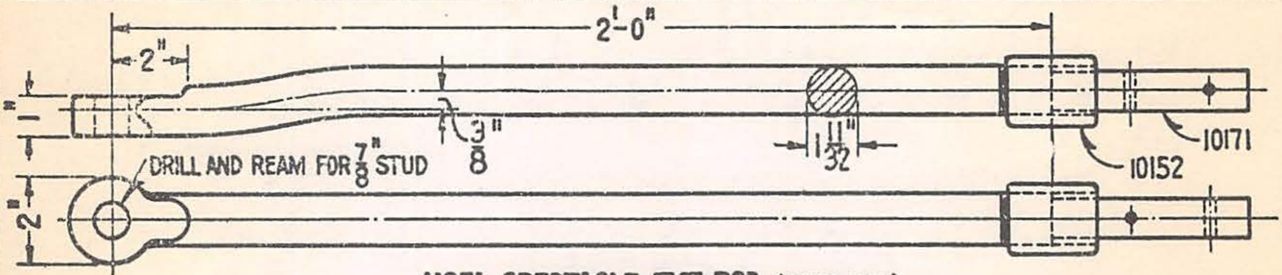
119413 ASSEMBLY OF BEARING (WITH "U" BOLTS 10831 ONLY)

119414 ASSEMBLY OF BEARING (WITH TWO 3/4 X 5 1/2 CLAMP BOLTS AND WASHERS ONLY)

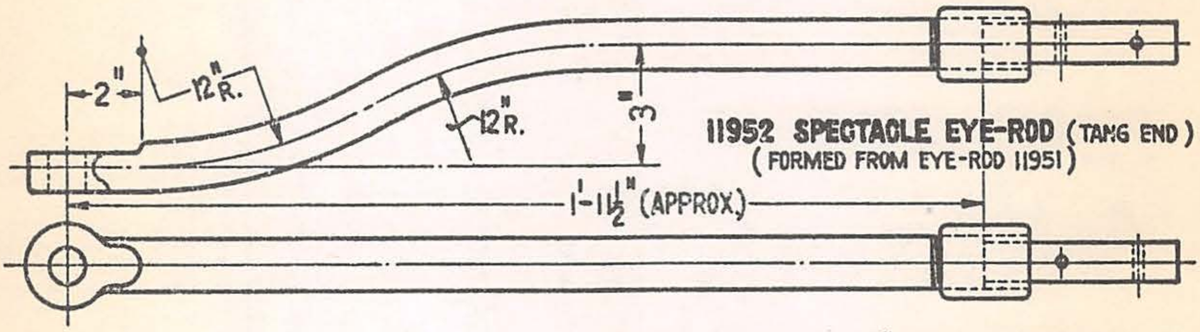
DETAILS AND ASSEMBLY OF MECHANICAL SEMAPHORE BEARING

						MAR.1920	MAR.1917	MAY.1916	MANUAL-FEB.1914	OCT.1912	1194

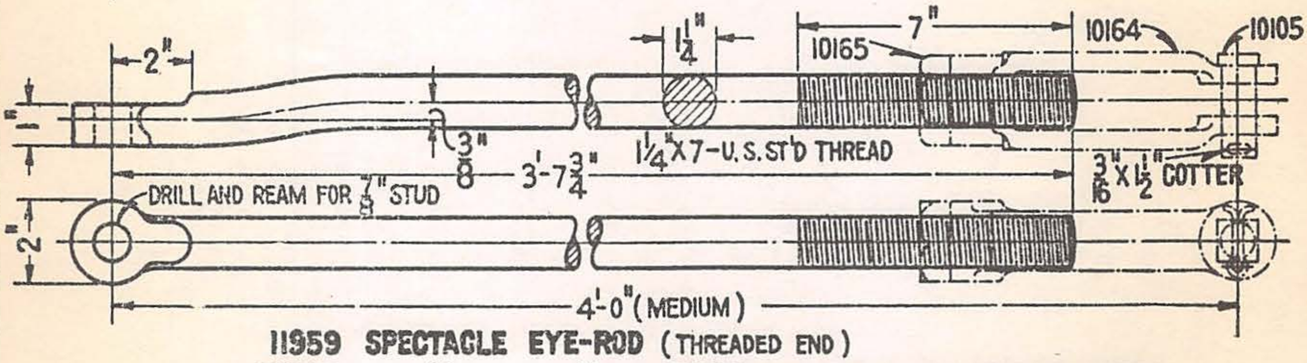
See 1082 and 1083 for further details.
Wrought iron shall be in accordance with Specification for Refined Iron Bars.
)


2'-0"
2"
1"
3/8"
1 11/32"
10152
10171
DRILL AND REAM FOR 7/8" STUD
2"

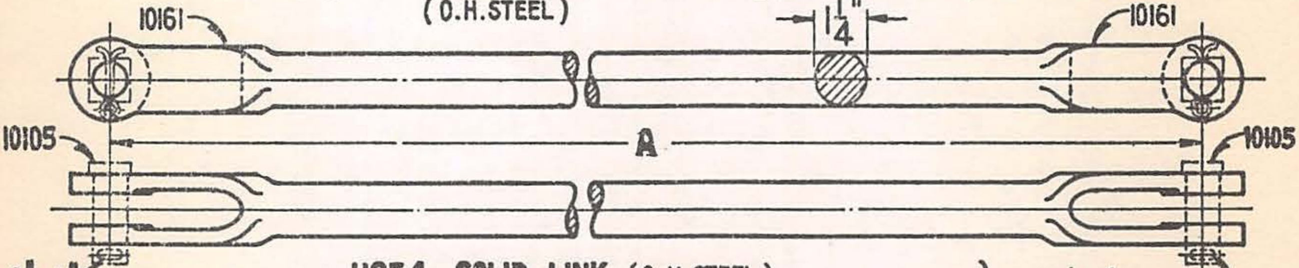
11951 SPECTACLE EYE-ROD (TANG END)
(O. H. STEEL)


2"
12"R.
12"R.
3"
1'-11 1/2" (APPROX.)

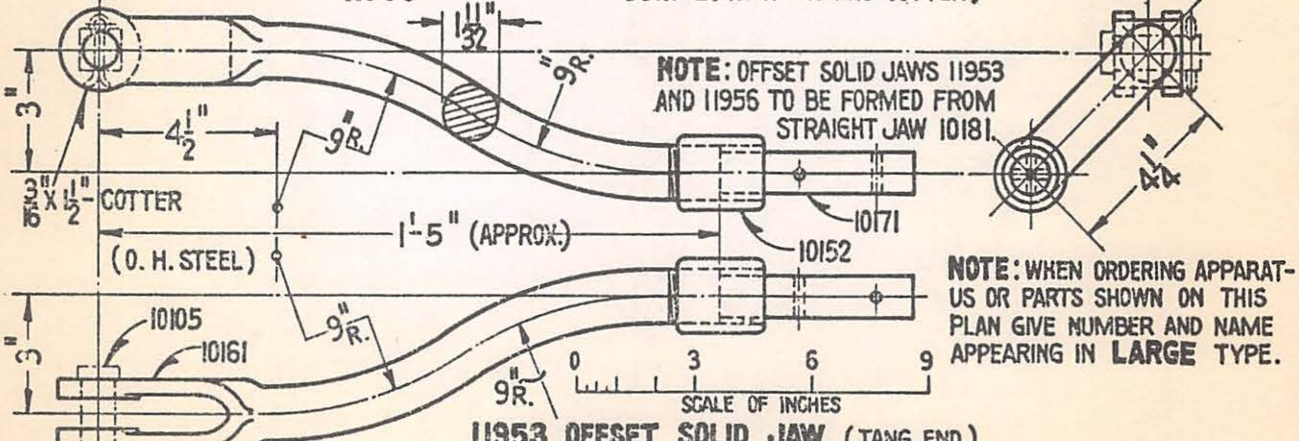
11952 SPECTACLE EYE-ROD (TANG END)
(FORMED FROM EYE-ROD 11951)


2"
1 1/4"
7"
10165
10164
10105
1"
3/8"
3'-7 3/4"
1 1/4" X 7-U.S. ST'D THREAD
3/16" X 1 1/2" COTTER
DRILL AND REAM FOR 7/8" STUD
2"
4'-0" (MEDIUM)

11959 SPECTACLE EYE-ROD (THREADED END)
119510 " " **COMPL.** WITH SCREW JAW, PIN AND COTTER.
(O.H.STEEL)


10161
1 1/4"
10161
10105
A
10105
3/16" X 1 1/2" COTTER
3/16" X 1 1/2" COTTER

11954 SOLID LINK (O. H. STEEL)
11957 " " **COMPL.** WITH PIN AND COTTER } A = 2'-9"
11955 " "
11958 " " **COMPL.** WITH PIN AND COTTER } A = 3'-10"


1 11/32"
9"R.
3"
4 1/2"
9"R.
4 1/4"
3/16" X 1 1/2" COTTER
1'-5" (APPROX.)
10171
10152
(O. H. STEEL)
9"R.
10105
10161
3"
9"R.
0
3
6
9
SCALE OF INCHES

NOTE: OFFSET SOLID JAWS 11953 AND 11956 TO BE FORMED FROM STRAIGHT JAW 10181.

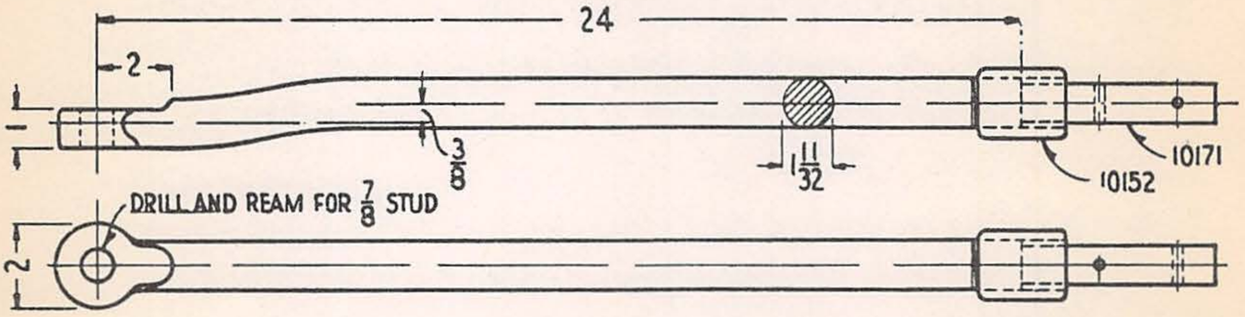
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

11953 OFFSET SOLID JAW (TANG END)
11956 " " " **COMPL.** WITH PIN AND COTTER (TANG END)

OPERATING CONNECTIONS FOR MECHANICAL SIGNALS
(DETAILS AND ASSEMBLY)

MAR. 1917 | M-2-1914 | OCT 1912

RSA
1195


24
2
1
3/8
1 11/32
10152
10171
DRILL AND REAM FOR 7/8 STUD
2

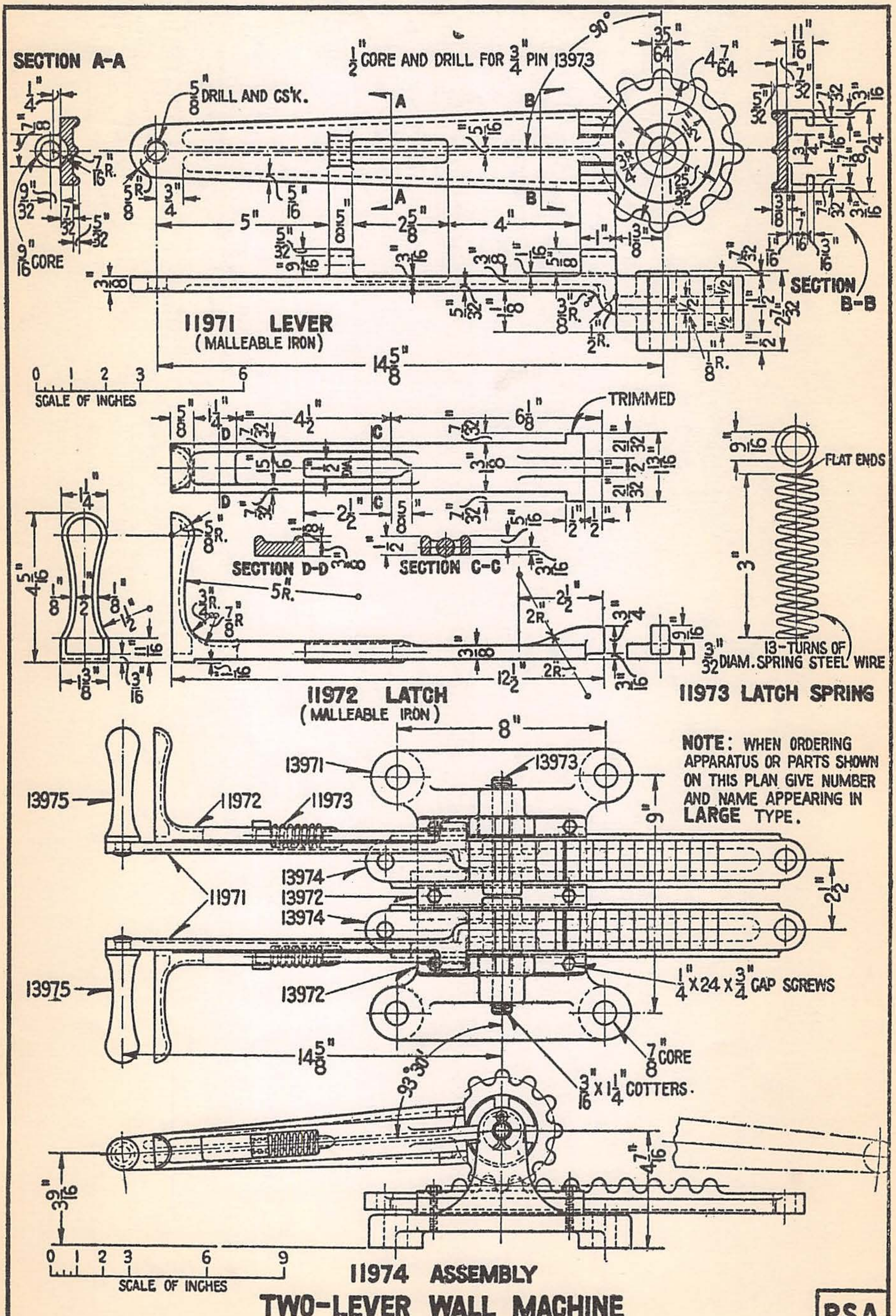
11951 SPECTACLE EYE-ROD (TANG END)
SAE-1020 STEEL

0 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

OPERATING CONNECTION FOR MECHANICAL SIGNALS

M-1941. | SEP 1941 | MAR.1917 | M-2-1914 | OCT 1912

AAR
SIG. SEC.
1195B


SECTION A-A
1/2" CORE AND DRILL FOR 3/4" PIN 13973
5/8" DRILL AND CS'K.
90°
35/64"
4 7/64"
SECTION B-B
9/16" CORE
11971 LEVER
(MALLEABLE IRON)
14 5/8"
SCALE OF INCHES
0 1 2 3 6
TRIMMED
FLAT ENDS
SECTION D-D
SECTION C-C
11972 LATCH
(MALLEABLE IRON)
12 1/2"
3"
13-TURNS OF 3/32" DIAM. SPRING STEEL WIRE
11973 LATCH SPRING
8"
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN LARGE TYPE.
13971
13973
13975
11972
11973
11971
13974
13972
13974
13972
13975
9"
2 1/2"
1/4" X 24 X 3/4" CAP SCREWS
14 5/8"
93° 30'
7/8" CORE
3/16" X 1 1/4" COTTERS.
3 9/16"
4 7/16"
SCALE OF INCHES
0 1 2 3 6 9

11974 ASSEMBLY

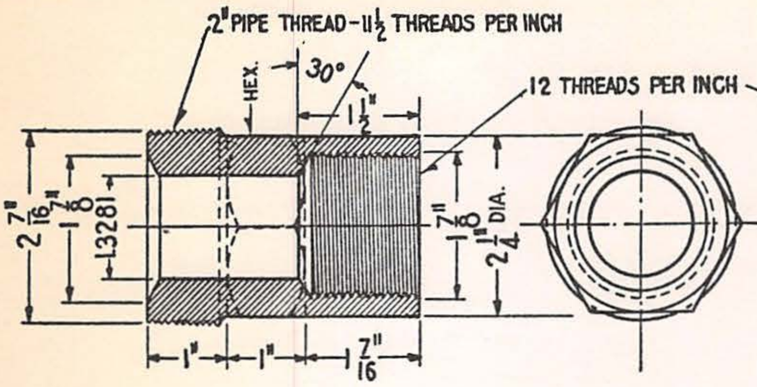
TWO-LEVER WALL MACHINE

(DETAILS AND ASSEMBLY)

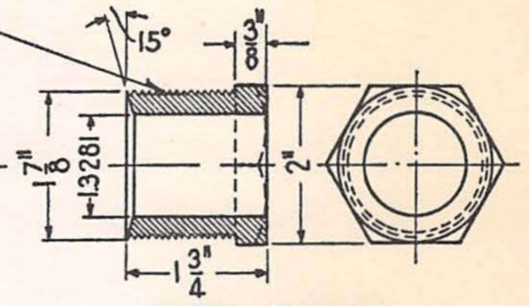
DEC. 1915 | SEP. 1915 | SEP. 1914 | OCT. 1912

RSA 1197

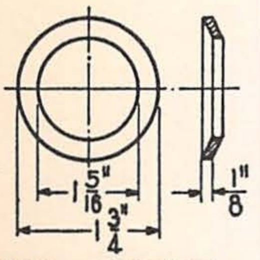
Malleable iron shall be in accordance with Specification for Malleable Iron Castings.


2" PIPE THREAD-11½ THREADS PER INCH
HEX.
30°
1½"
12 THREADS PER INCH
2 7/16"
1 7/8"
1.3281
1 7/8"
2 1/4" DIA.
1"
1"
1 7/16"

12251 EXTENSION GLAND
MALLEABLE IRON

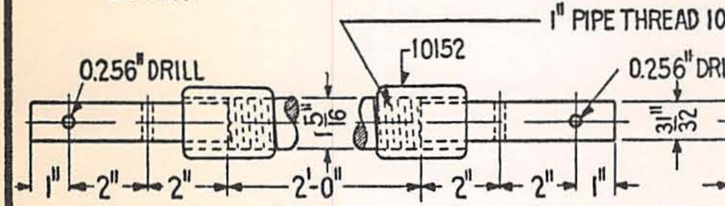

15°
3/8"
1 7/8"
1.3281
2"
1 3/4"

12252 BUSHING
CAST BRASS

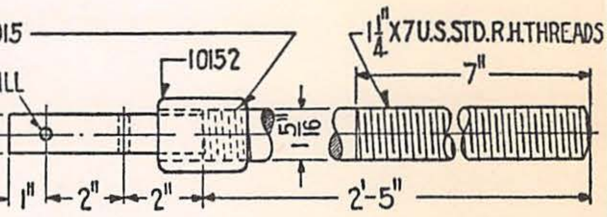


12253 GASKET
LEATHER

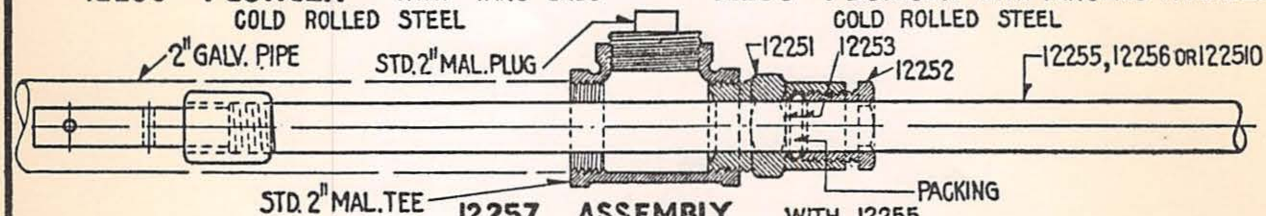
0 1 2 3
SCALE OF INCHES


1" PIPE THREAD 1015
0.256" DRILL
10152
0.256" DRILL
31/32"
5/16"
1"
2"
2"
2'-0"
2"
2"
1"

12255 PLUNGER WITH TANG ENDS
COLD ROLLED STEEL

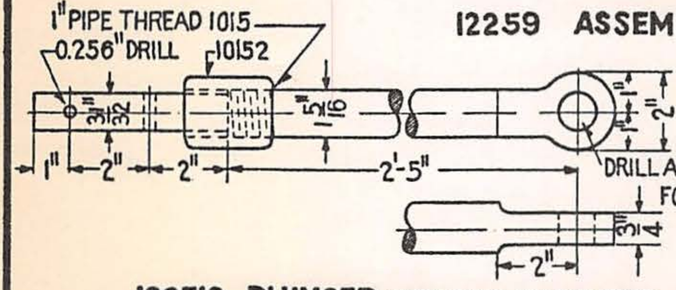

1 1/4" X 7 U.S.STD.R.H.THREADS
10152
7"
5/16"
1"
2"
2"
2'-5"

12256 PLUNGER WITH TANG AND THREADED ENDS
COLD ROLLED STEEL


2" GALV. PIPE
STD. 2" MAL. PLUG
12251
12253
12252
12255, 12256 OR 122510
PACKING
STD. 2" MAL. TEE

12257 ASSEMBLY WITH 12255
12258 ASSEMBLY WITH 12256
12259 ASSEMBLY WITH 122510

0 1 2 3 4 5 6
SCALE OF INCHES


1" PIPE THREAD 1015
0.256" DRILL
10152
31/32"
5/16"
1"
2"
1"
1"
2"
2"
2'-5"
DRILL AND REAM FOR 7/8" PIN
3/4"
2"

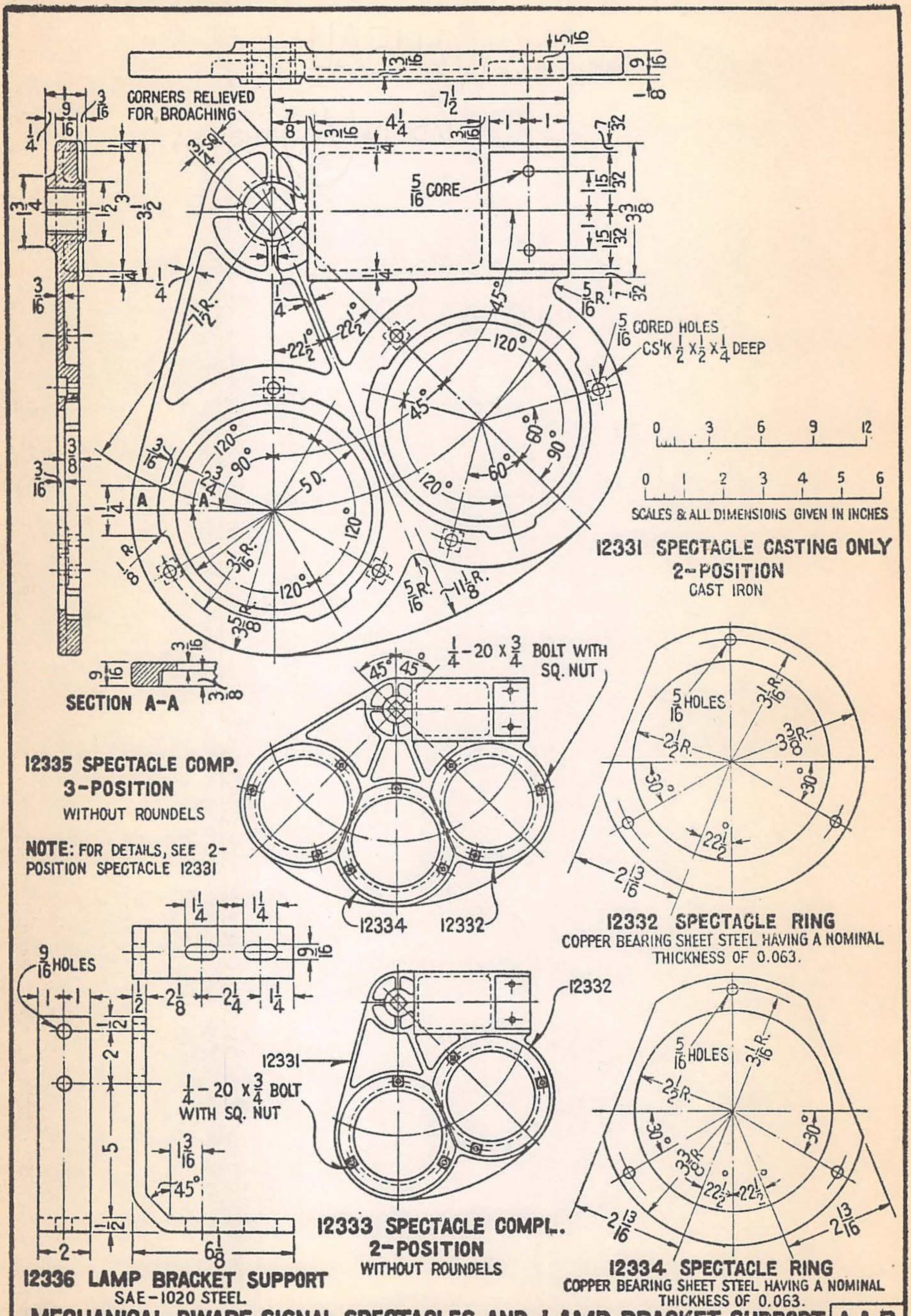
122510 PLUNGER WITH TANG AND EYE ENDS
COLD ROLLED STEEL

STUFFING BOX

FOR ONE-INCH PIPE

MAN. 1926	SEP. 1924	MAR. 1913	OCT. 1912	ARA SIG. SEC. 1225B

Malleable iron shall be in accordance with Specification for Malleable Iron Castings.


CORNERS RELIEVED FOR BROACHING
$\frac{3}{4}$ SQ.
$\frac{5}{16}$ CORE
$\frac{5}{16}$ CORED HOLES CS'K $\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{1}{4}$ DEEP
0 3 6 9 12
0 1 2 3 4 5 6
SCALES & ALL DIMENSIONS GIVEN IN INCHES
12331 SPECTACLE CASTING ONLY
2-POSITION
CAST IRON
SECTION A-A
$\frac{1}{4}$-20 X $\frac{3}{4}$ BOLT WITH SQ. NUT
12335 SPECTACLE COMP.
3-POSITION
WITHOUT ROUNDELS
NOTE: FOR DETAILS, SEE 2-POSITION SPECTACLE 12331
12334
12332
$\frac{5}{16}$ HOLES
12332 SPECTACLE RING
COPPER BEARING SHEET STEEL HAVING A NOMINAL THICKNESS OF 0.063.
$\frac{9}{16}$ HOLES
12331
$\frac{1}{4}$-20 X $\frac{3}{4}$ BOLT WITH SQ. NUT
12332
12336 LAMP BRACKET SUPPORT
SAE-1020 STEEL
12333 SPECTACLE COMPL.
2-POSITION
WITHOUT ROUNDELS
12334 SPECTACLE RING
COPPER BEARING SHEET STEEL HAVING A NOMINAL THICKNESS OF 0.063.

MECHANICAL DWARF SIGNAL SPECTACLES AND LAMP BRACKET SUPPORT

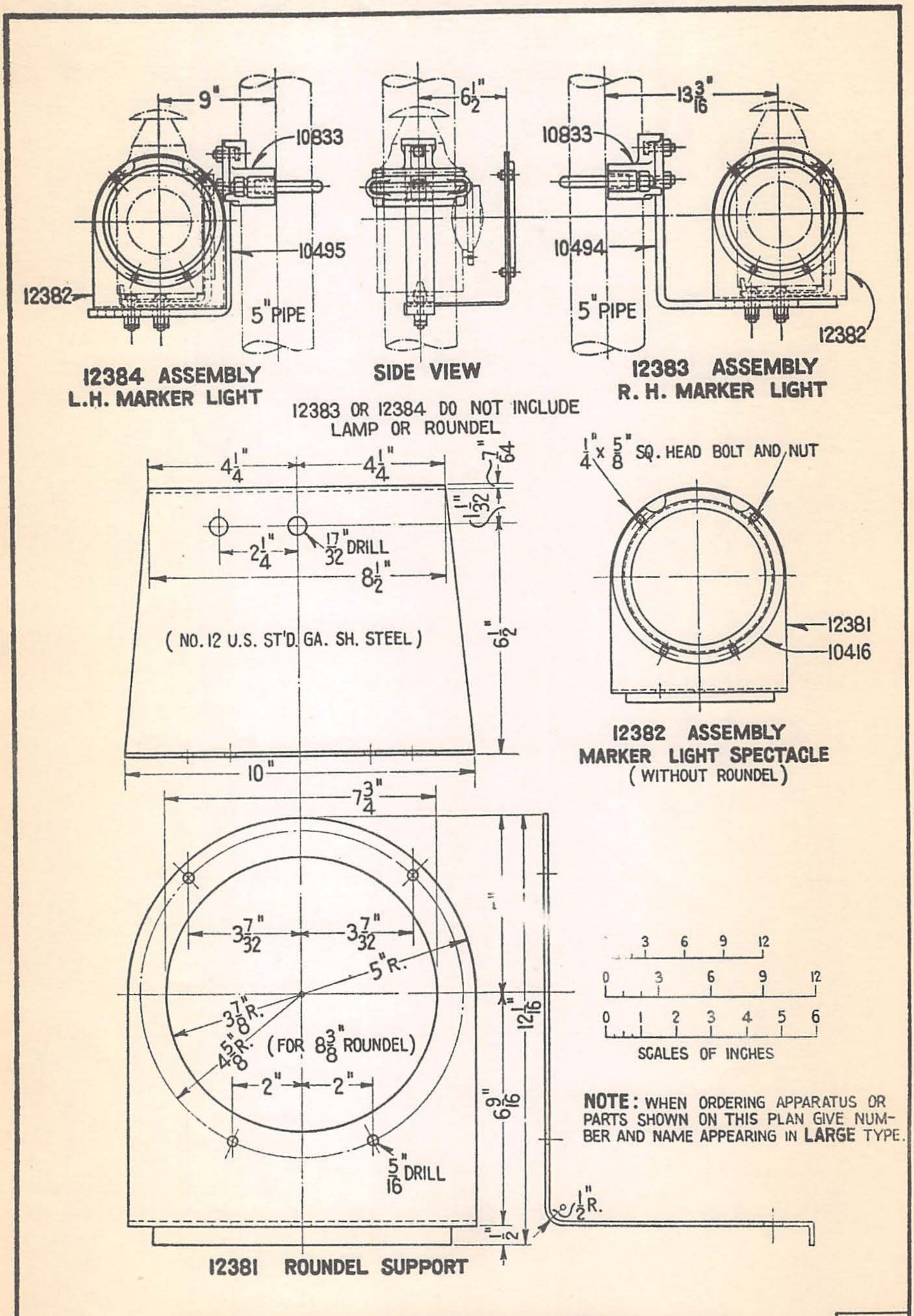
DETAILS AND ASSEMBLY

M-1946	OCT. 1946	SEP. 1914	OCT. 1912	AAR SIG. SEC. 1233B

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.

PRINTED IN U. S. A.


9"
10833
10495
12382
5" PIPE
6½"
13 3/16"
10833
10494
5" PIPE
12382
4¼"
4¼"
7/64"
1 1/32"
2¼"
17/32" DRILL
8½"
6½"
(NO. 12 U.S. ST'D. GA. SH. STEEL)
10"
¼" x 5/8" SQ. HEAD BOLT AND NUT
12381
10416
7¾"
3 7/32"
3 7/32"
5" R.
3 7/8" R.
4 5/8" R.
(FOR 8 3/8" ROUNDEL)
12 1/16"
2"
2"
6 9/16"
5/16" DRILL
½" R.
½"
3 6 9 12
0 3 6 9 12
0 1 2 3 4 5 6

12384 ASSEMBLY
L.H. MARKER LIGHT

SIDE VIEW

12383 ASSEMBLY
R.H. MARKER LIGHT

12383 OR 12384 DO NOT INCLUDE LAMP OR ROUNDEL

12382 ASSEMBLY
MARKER LIGHT SPECTACLE
(WITHOUT ROUNDEL)

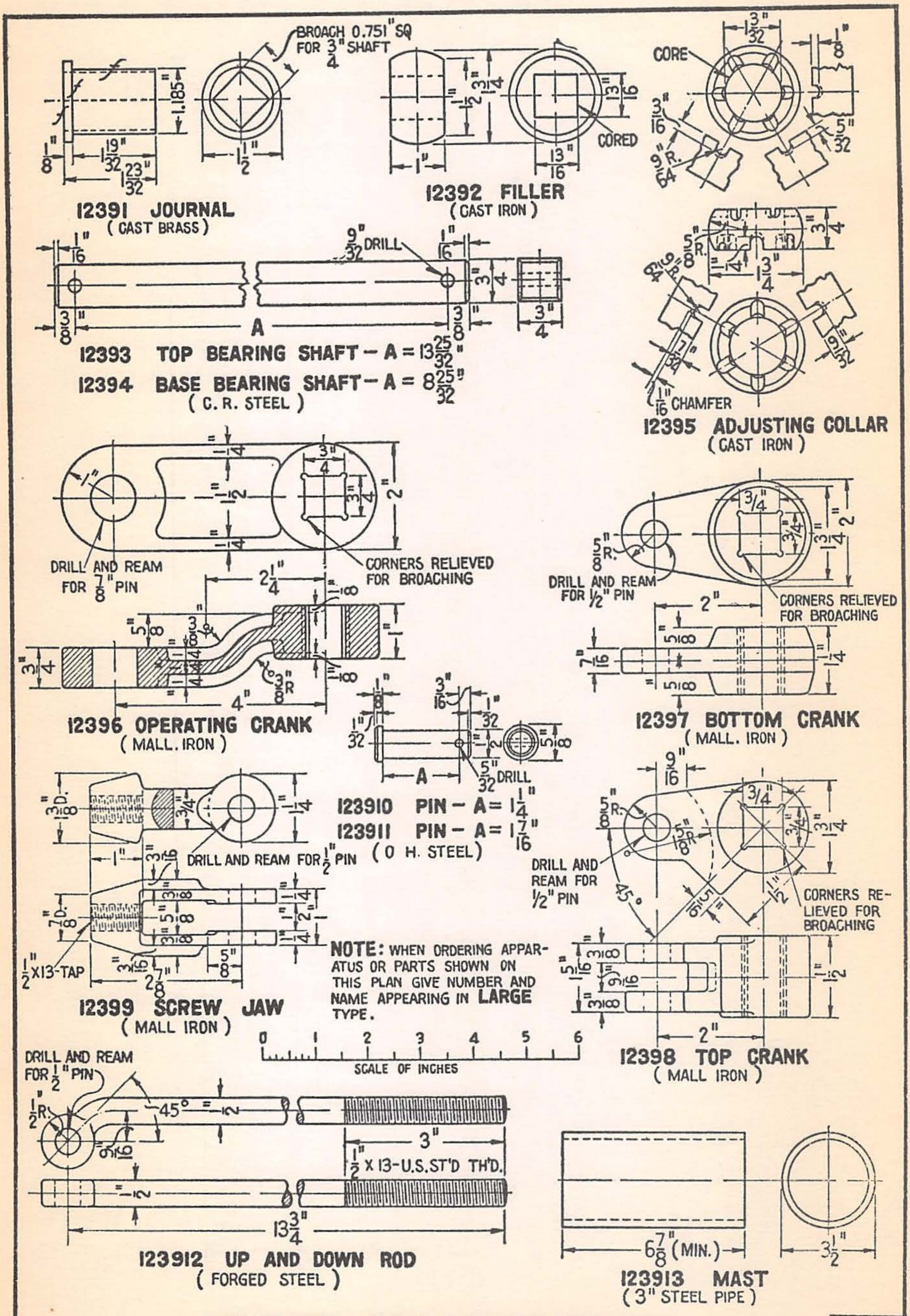
SCALES OF INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

12381 ROUNDEL SUPPORT

DETAILS AND ASSEMBLY OF MARKER LIGHTS

ARA
SIG. SEC.
MAR. 1914 1238A

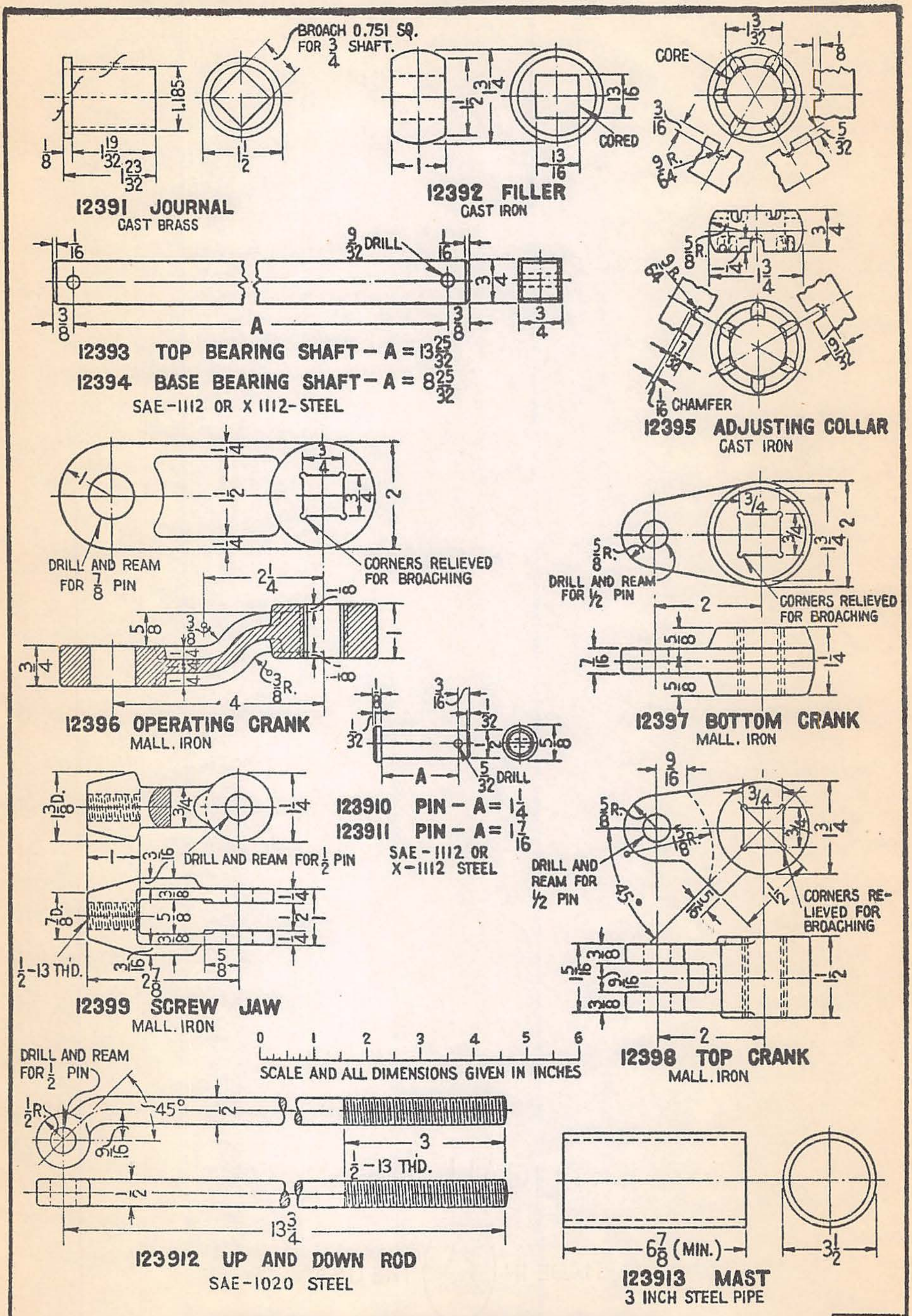

12391 JOURNAL
(CAST BRASS)
BROACH 0.751" SQ FOR 3/4" SHAFT
1.185"
1/8"
1 19/32"
1 23/32"
1 1/2"
12392 FILLER
(CAST IRON)
1 1/2"
1 3/4"
1"
13/16"
CORED
12393 TOP BEARING SHAFT – A = 13 25/32"
12394 BASE BEARING SHAFT – A = 8 25/32"
(C. R. STEEL)
9/32" DRILL
1/16"
3/4"
3/8"
A
CORE
1 3/32"
1/8"
3/16"
5/32"
9/64" R.
5/8" R.
1/4"
1 3/4"
3/4"
1/16" CHAMFER
12395 ADJUSTING COLLAR
(CAST IRON)
1"
1/4"
1/2"
3/4"
2"
DRILL AND REAM FOR 7/8" PIN
CORNERS RELIEVED FOR BROACHING
2 1/4"
5/8"
3/8"
1/8"
1"
4"
3/8" R
12396 OPERATING CRANK
(MALL. IRON)
5/8" R.
DRILL AND REAM FOR 1/2" PIN
2"
1 3/4"
3/4"
7/16"
1 1/4"
CORNERS RELIEVED FOR BROACHING
12397 BOTTOM CRANK
(MALL. IRON)
3/16"
1/8"
1/32"
1/2"
5/8"
5/32" DRILL
A
123910 PIN – A = 1 1/4"
123911 PIN – A = 1 7/16"
(O. H. STEEL)
1 1/8" D.
3/4"
1 1/4"
1"
3/16"
DRILL AND REAM FOR 1/2" PIN
7/8" D.
1/2" X 13-TAP
2 7/8"
5/8"
12399 SCREW JAW
(MALL IRON)
9/16"
5/8" R.
3/4"
1 1/4"
DRILL AND REAM FOR 1/2" PIN
45°
5/16"
1 1/2"
CORNERS RELIEVED FOR BROACHING
1 5/16"
9/16"
2"
12398 TOP CRANK
(MALL IRON)
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN LARGE TYPE.
0 1 2 3 4 5 6
SCALE OF INCHES
DRILL AND REAM FOR 1/2" PIN
1/2" R.
45°
9/16"
3"
1/2" X 13-U.S.ST'D TH'D.
13 3/4"
123912 UP AND DOWN ROD
(FORGED STEEL)
6 7/8" (MIN.)
3 1/2"
123913 MAST
(3" STEEL PIPE)

MECHANICAL DWARF SIGNAL FITTINGS
(DETAILS)

RSA
1239

SEP. 1914 | OCT. 1913

See 1097, 1232 and 1233.
Cast iron shall be in accordance with Specification for Gray Iron Castings.
Malleable iron shall be in accordance with Specification for Malleable Iron Castings.



BROACH 0.751 SQ. FOR 3/4 SHAFT.
1.185
1/8
1 19/32
1 23/32
1 1/2
12391 JOURNAL
CAST BRASS
1 1/2
3/4
1
13/16
CORED
12392 FILLER
CAST IRON
CORE
1 3/32
1/8
3/16
5/32
9/64 R.
1/16
9/32 DRILL
3/8
A
3/4
12393 TOP BEARING SHAFT – A = 13 25/32
12394 BASE BEARING SHAFT – A = 8 25/32
SAE-1112 OR X 1112-STEEL
5/8 R.
1 3/4
5/64 R.
1/16 CHAMFER
12395 ADJUSTING COLLAR
CAST IRON
1/4
1 1/2
2
DRILL AND REAM FOR 7/8 PIN
CORNERS RELIEVED FOR BROACHING
2 1/4
5/8
3/16
1/8
1
4
3/8 R.
12396 OPERATING CRANK
MALL. IRON
3/16
1/32
5/8
5/32 DRILL
123910 PIN – A = 1 1/4
123911 PIN – A = 1 7/16
SAE-1112 OR X-1112 STEEL
3/4
5/8 R.
DRILL AND REAM FOR 1/2 PIN
CORNERS RELIEVED FOR BROACHING
2
7/16
1 1/4
12397 BOTTOM CRANK
MALL. IRON
1 1/8 D.
1 1/4
DRILL AND REAM FOR 1/2 PIN
7/8 D.
1/2-13 THD.
2 7/8
12399 SCREW JAW
MALL. IRON
9/16
5/8 R.
DRILL AND REAM FOR 1/2 PIN
45°
CORNERS RELIEVED FOR BROACHING
1 5/16
1 1/2
2
12398 TOP CRANK
MALL. IRON
0 1 2 3 4 5 6
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
DRILL AND REAM FOR 1/2 PIN
1/2 R.
45°
1/2
9/16
3
1/2-13 THD.
13 3/4
123912 UP AND DOWN ROD
SAE-1020 STEEL
6 7/8 (MIN.)
3 1/2
123913 MAST
3 INCH STEEL PIPE

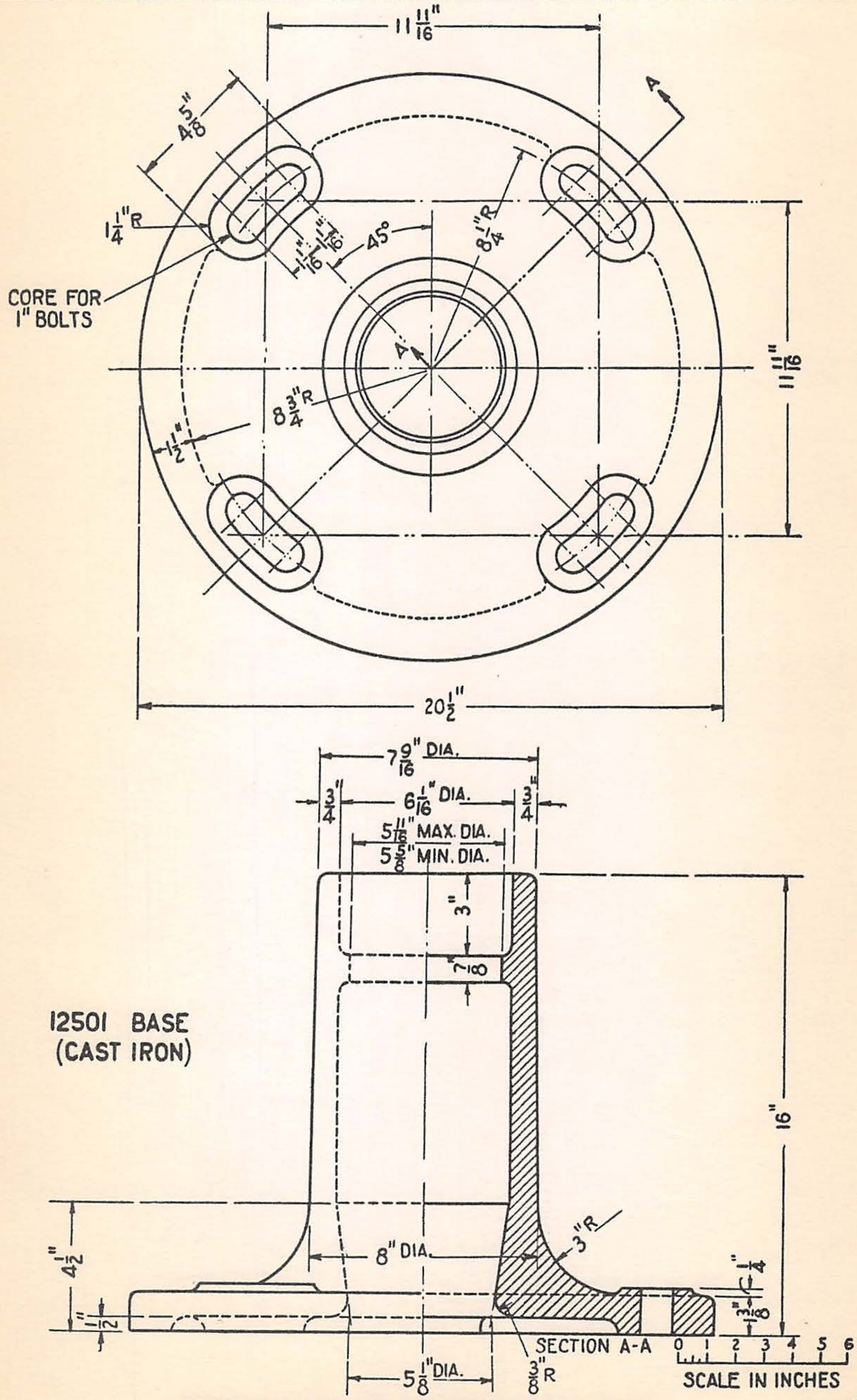
MECHANICAL DWARF SIGNAL FITTINGS

DETAILS

AAR SIG. SEC. 1239B

M-1946	OCT. 1946	SEP. 1914	OCT. 1913

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Malleable iron shall be in accordance with Specification for Malleable Iron Castings, Manual Part 89; Threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.

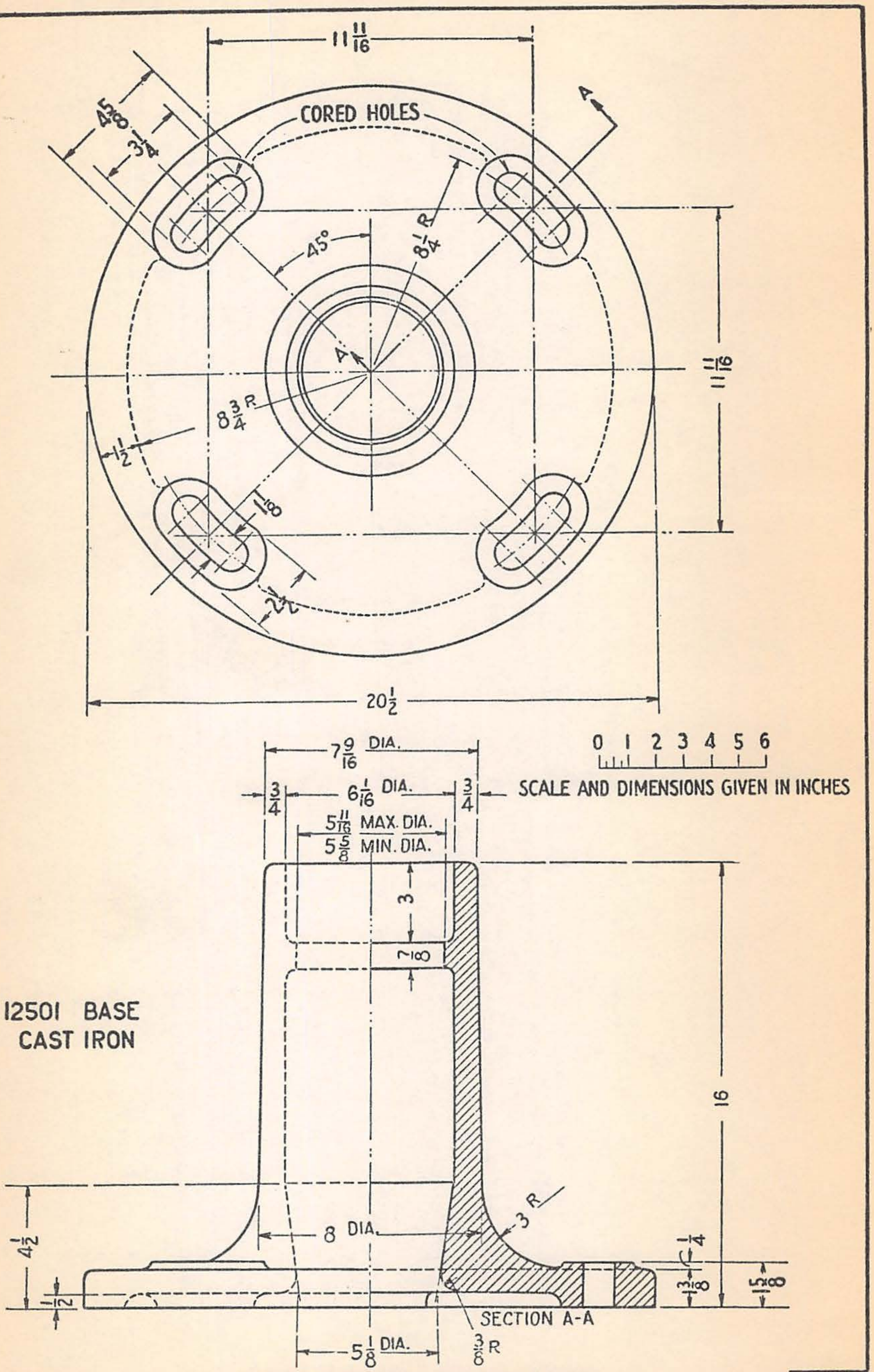

11 11/16"
A
4 5/8"
1 1/4"R
1 1/16"
1 1/16"
45°
8 1/4"R
CORE FOR 1" BOLTS
A
8 3/4"R
1 1/2"
11 11/16"
20 1/2"
7 9/16" DIA.
3/4"
6 1/16" DIA.
3/4"
5 11/16" MAX. DIA.
5 5/8" MIN. DIA.
3"
7/8"
12501 BASE (CAST IRON)
16"
4 1/2"
1 1/2"
8" DIA.
3"R
1/4"
3/8"
SECTION A-A
0 1 2 3 4 5 6
SCALE IN INCHES
5 1/8" DIA.
3/8"R

SOCKET BASE FOR 5 INCH MAST

AAR
SIG. SEC.
1250A

M-1935 MAR1935

Material shall be in accordance with Specification for Gray Iron Castings.


11 11/16
CORED HOLES
4 5/8
3 1/4
A
45°
8 1/4 R
A
11 11/16
8 3/4 R
1/2
1/8
2 1/2
20 1/2
7 9/16 DIA.
3/4
6 1/16 DIA.
3/4
5 11/16 MAX. DIA.
5 5/8 MIN. DIA.
0 1 2 3 4 5 6
SCALE AND DIMENSIONS GIVEN IN INCHES
3
7/8
12501 BASE
CAST IRON
16
3 R
4 1/2
8 DIA.
1/4
1 3/8
1 5/8
1/2
SECTION A-A
5 1/8 DIA.
3/8 R

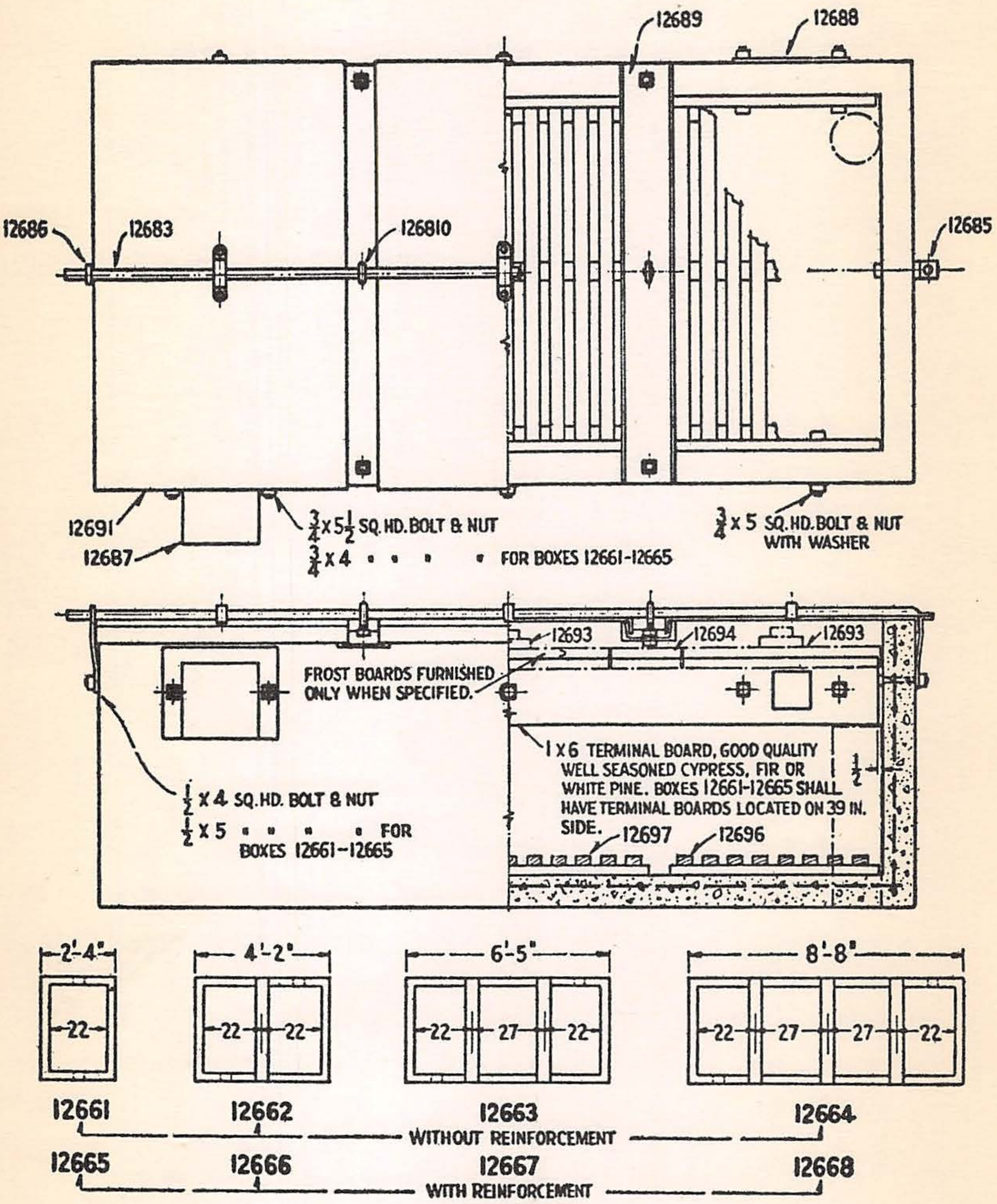
BASE FOR 5 INCH MAST

AAR
SIG. SEC.
1250B

M-1947	SEP. 1947	M-1935	MAR1935

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

PRINTED IN U. S. A.

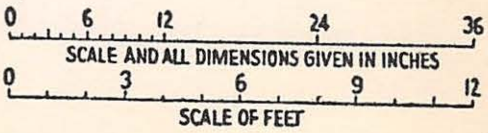

12689
12688
12686
12683
126810
12685
12691
12687
3/4 x 5 1/2 SQ. HD. BOLT & NUT
3/4 x 4 " " " FOR BOXES 12661-12665
3/4 x 5 SQ. HD. BOLT & NUT WITH WASHER
12693
12694
12693
FROST BOARDS FURNISHED ONLY WHEN SPECIFIED.
1 X 6 TERMINAL BOARD, GOOD QUALITY WELL SEASONED CYPRESS, FIR OR WHITE PINE. BOXES 12661-12665 SHALL HAVE TERMINAL BOARDS LOCATED ON 39 IN. SIDE.
1/2
1/2 X 4 SQ. HD. BOLT & NUT
1/2 X 5 " " " FOR BOXES 12661-12665
12697
12696
2'-4"
4'-2"
6'-5"
8'-8"
22
22
22
22
27
22
22
27
27
22
12661
12662
12663
12664
WITHOUT REINFORCEMENT
12665
12666
12667
12668
WITH REINFORCEMENT

ASSEMBLIES

NOTES: ONE OUTLET CAP AND ONE OUTLET COVER WITH SCREEN OF THIRTY FIVE MESH COPPER TO FIT COVER SHALL BE PROVIDED WITH EACH BOX.

THE INSIDE SURFACE AND TOP EDGES OF BOX AND ALL SURFACES OF TERMINAL BOARDS, SLAT FLOOR AND FROST BOARDS SHALL BE GIVEN TWO COATS OF ASPHALTUM PAINT BEFORE INSTALLATION.

IRON WORK SHALL BE THOROUGHLY CLEANED AND GIVEN A PRIMING BRUSH OR DIPPING COAT OF RED OXIDE OR GRAPHITE PAINT. EXTERIOR IRON WORK SHALL BE GIVEN TWO COATS OF LIGHT GRAY PAINT AND INTERIOR IRON WORK SHALL BE GIVEN TWO COATS OF ASPHALTUM PAINT.

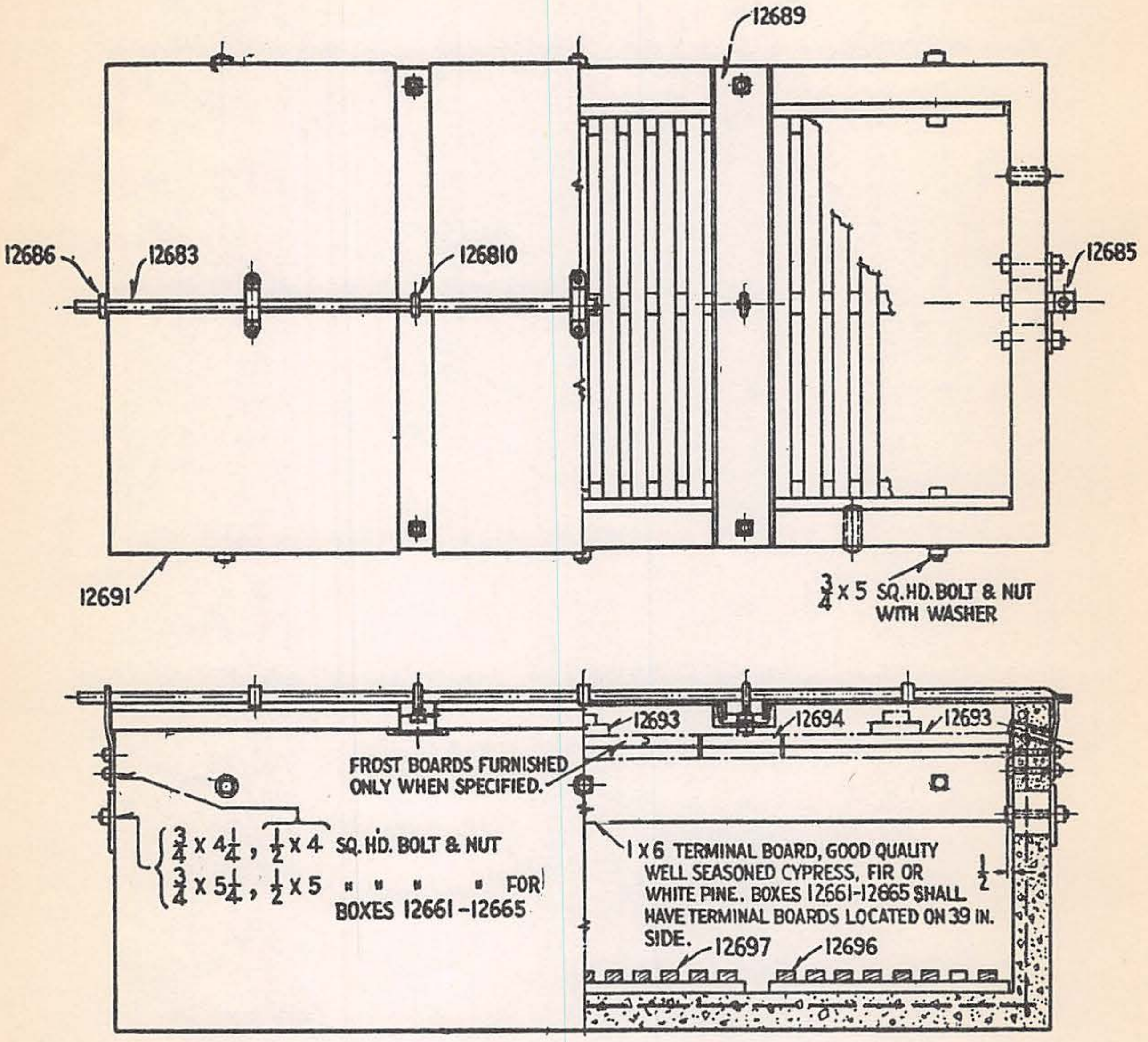

0
6
12
24
36
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
0
3
6
9
12
SCALE OF FEET

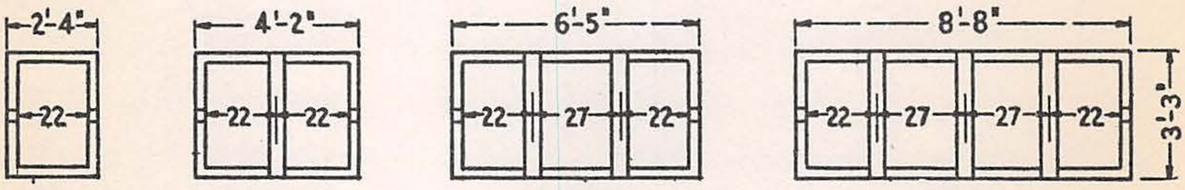
CONCRETE BATTERY BOX

ASSEMBLIES

M-1939	MAR. 1939	M-1936	MAR. 1936

AAR
SIG. SEC.
1266B


12689
12686
12683
126810
12685
12691
$\frac{3}{4}$ x 5 SQ. HD. BOLT & NUT WITH WASHER
12693
12694
12693
FROST BOARDS FURNISHED ONLY WHEN SPECIFIED.
$\frac{3}{4}$ x $4\frac{1}{4}$, $\frac{1}{2}$ x 4 SQ. HD. BOLT & NUT
$\frac{3}{4}$ x $5\frac{1}{4}$, $\frac{1}{2}$ x 5 " " " " FOR BOXES 12661-12665
1 X 6 TERMINAL BOARD, GOOD QUALITY WELL SEASONED CYPRESS, FIR OR WHITE PINE. BOXES 12661-12665 SHALL HAVE TERMINAL BOARDS LOCATED ON 39 IN. SIDE.
$\frac{1}{2}$
12697
12696


2'-4"
22
4'-2"
22
22
6'-5"
22
27
22
8'-8"
22
27
27
22
3'-3"

12661	12662	12663	12664
1003 LBS.	1667 LBS.	2321 LBS.	2990 LBS.
WITHOUT REINFORCEMENT			
12665	12666	12667	12668
1031 LBS.	1698 LBS.	2357 LBS.	3037 LBS.
WITH REINFORCEMENT			

ASSEMBLIES

NOTES: THE INSIDE SURFACE AND TOP EDGES OF BOX AND ALL SURFACES OF TERMINAL BOARDS, SLAT FLOOR AND FROST BOARDS SHALL BE GIVEN TWO COATS OF ASPHALTUM PAINT BEFORE INSTALLATION.

IRON WORK SHALL BE THOROUGHLY CLEANED AND GIVEN A PRIMING BRUSH OR DIPPING COAT OF RED OXIDE OR GRAPHITE PAINT. EXTERIOR IRON WORK SHALL BE GIVEN TWO COATS OF LIGHT GRAY PAINT AND INTERIOR IRON WORK SHALL BE GIVEN TWO COATS OF ASPHALTUM PAINT.

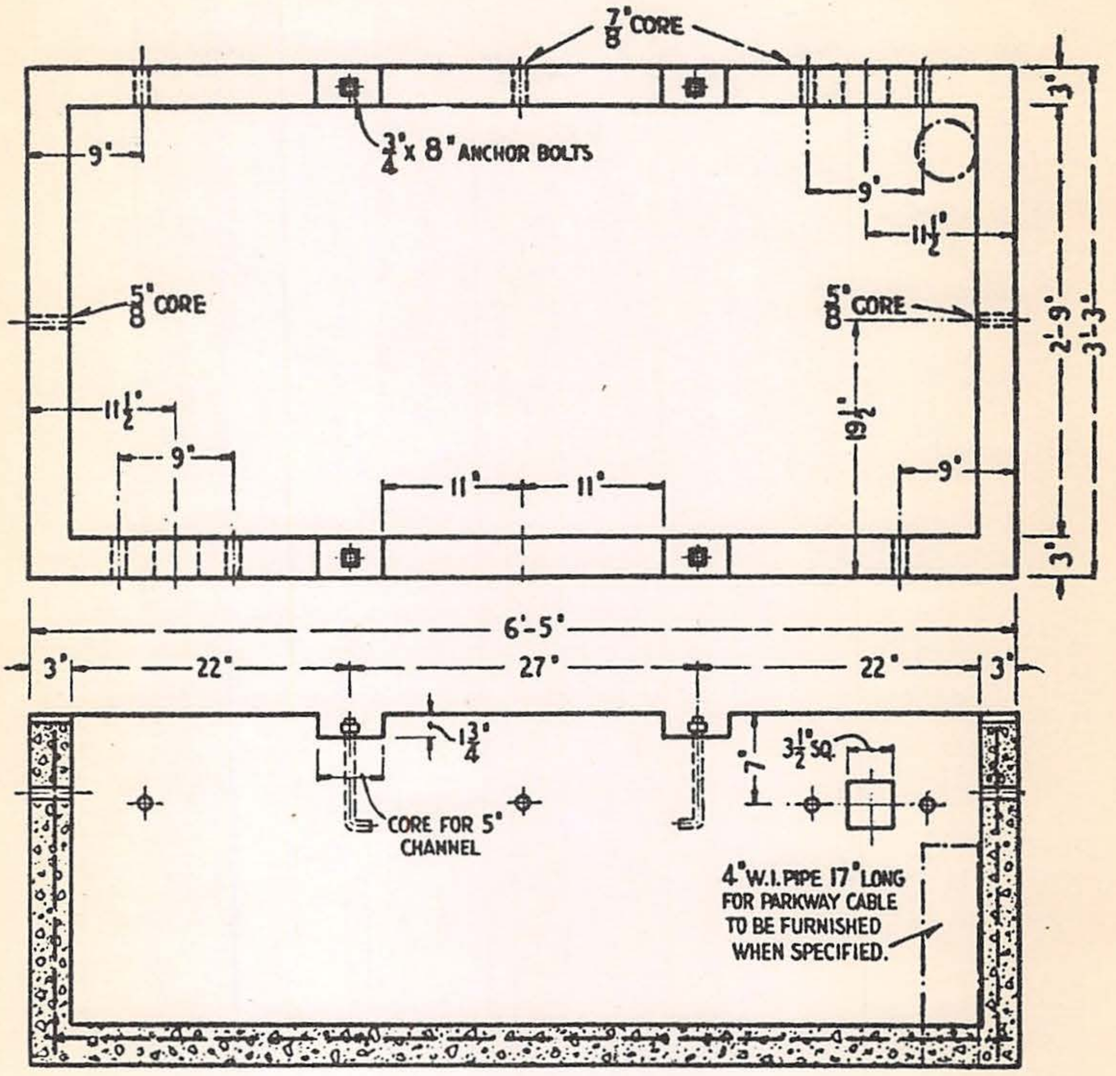
0 6 12 24 36
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
0 3 6 9 12
SCALE OF FEET

CONCRETE BATTERY BOX

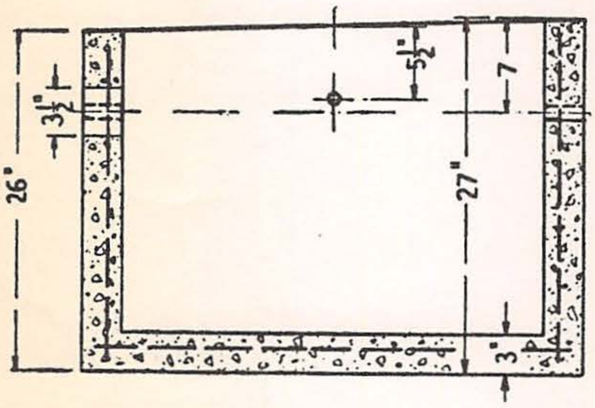
ASSEMBLIES

M-1941	SEP. 1941	M-1939	MAR. 1939	M-1936	MAR. 1936

AAR
SIG. SEC.
1266C



4" W.I. PIPE 17" LONG FOR PARKWAY CABLE TO BE FURNISHED WHEN SPECIFIED.



REINFORCEMENT.

REINFORCEMENT WHEN SPECIFIED SHALL BE AS FOLLOWS:

REINFORCING MATERIAL SHALL BE DEFORMED 3/8 IN. ROUND STEEL ROD OR ITS EQUIVALENT.

REINFORCEMENT SHALL BE PLACED NOT LESS THAN 1 IN. FROM INSIDE OR OUTSIDE SURFACE OF BOX.

TWO REINFORCING RODS PROPERLY BENT SHALL FORM TWO COMPLETE REINFORCING BANDS AROUND TOP OF BOX ABOVE OUTLETS, ENDS OF EACH ROD SHALL LAP NOT LESS THAN 6 IN.

ONE REINFORCING ROD OF LENGTH 2 IN. LESS THAN THE HEIGHT OF WALL, SHALL BE PLACED VERTICALLY 2 IN. FROM INSIDE CORNER IN EACH WALL.

BOTTOM OF BOX SHALL BE REINFORCED LENGTHWISE AND CROSSWISE WITH REINFORCING RODS OF LENGTH 2 IN. LESS THAN OUTSIDE DIMENSION OF THE BOX AND SPACED NOT MORE THAN 12 IN. APART.

CONCRETE.

BOX SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.

COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.

NOT LESS THAN 7 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.

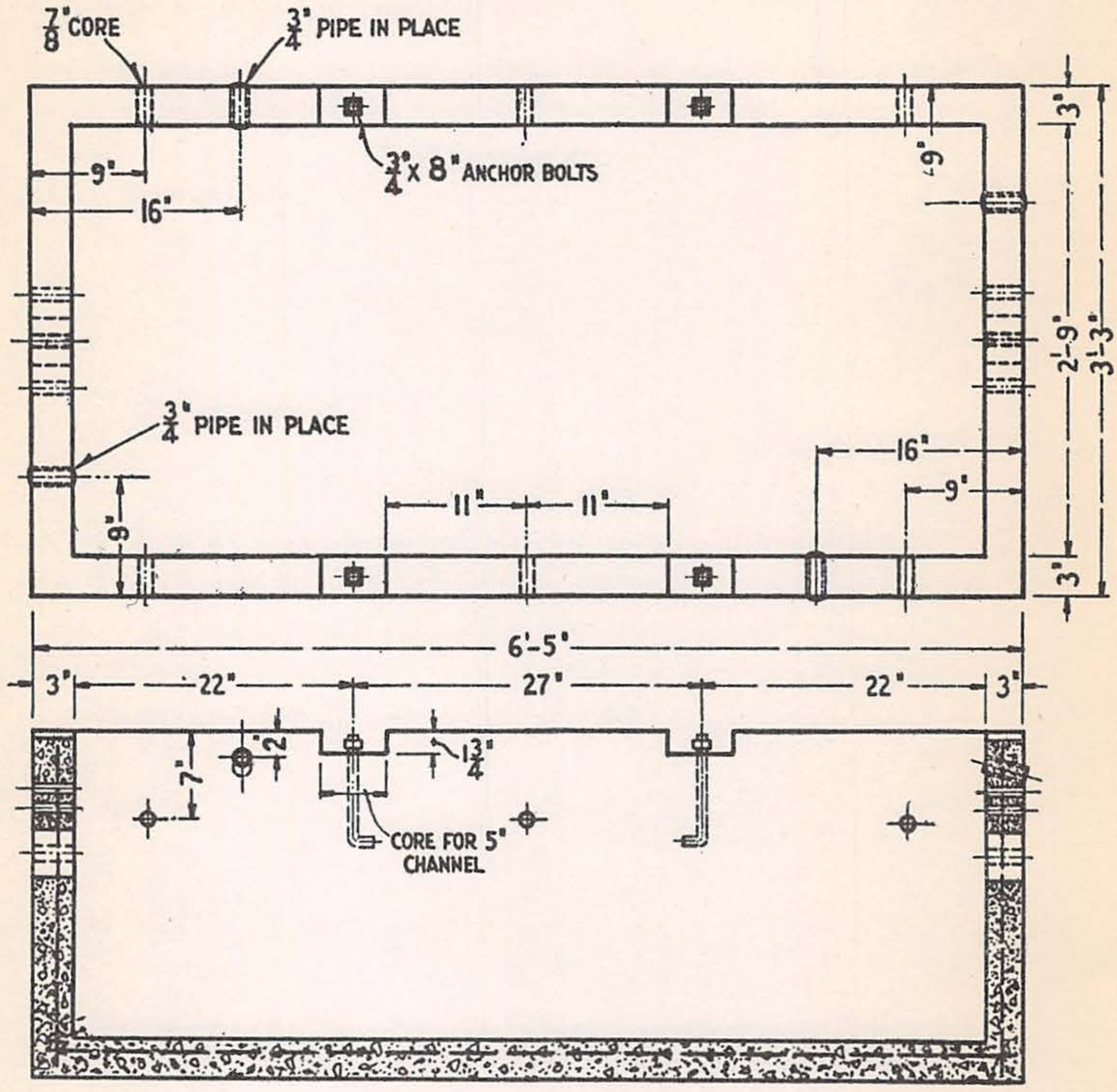
WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 3000 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED

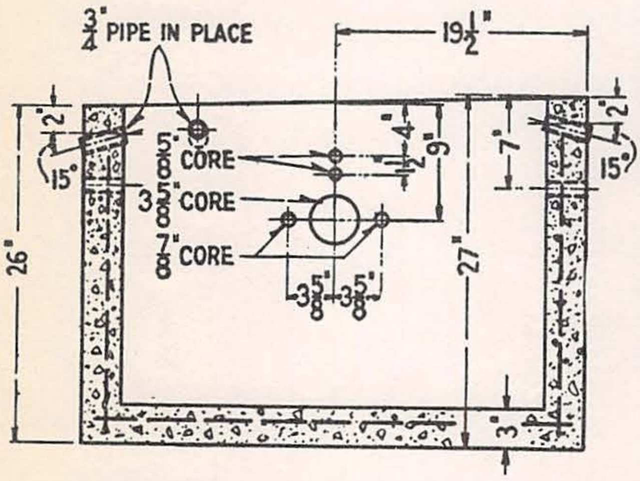
CONCRETE BATTERY BOX

DETAILS

M-1939	MAR.1939	M-1936	MAR.1936

AAR
SIG.SEC.
1267B


7/8" CORE
3/4" PIPE IN PLACE
3/4" x 8" ANCHOR BOLTS
9"
16"
9"
3"
2'-9"
3'-3"
3"
3/4" PIPE IN PLACE
9"
11"
11"
16"
9"
6'-5"
3"
22"
27"
22"
3"
7"
2"
1 3/4"
CORE FOR 5" CHANNEL


3/4" PIPE IN PLACE
19 1/2"
2"
15°
7/8" CORE
3" CORE
7/8" CORE
4"
2"
1 1/2"
9"
7"
2"
15°
26"
27"
3 5/8"
3 5/8"
3"

REINFORCEMENT.

REINFORCEMENT WHEN SPECIFIED SHALL BE AS FOLLOWS:

REINFORCING MATERIAL SHALL BE DEFORMED 3/8 IN. ROUND STEEL ROD OR ITS EQUIVALENT.

REINFORCEMENT SHALL BE PLACED NOT LESS THAN 1 IN. FROM INSIDE OR OUTSIDE SURFACE OF BOX.

TWO REINFORCING RODS PROPERLY BENT SHALL FORM TWO COMPLETE REINFORCING BANDS AROUND TOP OF BOX ABOVE OUTLETS, ENDS OF EACH ROD SHALL LAP NOT LESS THAN 6 IN.

ONE REINFORCING ROD OF LENGTH 2 IN. LESS THAN THE HEIGHT OF WALL, SHALL BE PLACED VERTICALLY 2 IN. FROM INSIDE CORNER IN EACH WALL.

BOTTOM OF BOX SHALL BE REINFORCED LENGTHWISE AND CROSSWISE WITH REINFORCING RODS OF LENGTH 2 IN. LESS THAN OUTSIDE DIMENSION OF THE BOX AND SPACED NOT MORE THAN 12 IN. APART.

CONCRETE.

BOX SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.

COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.

NOT LESS THAN 7 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.

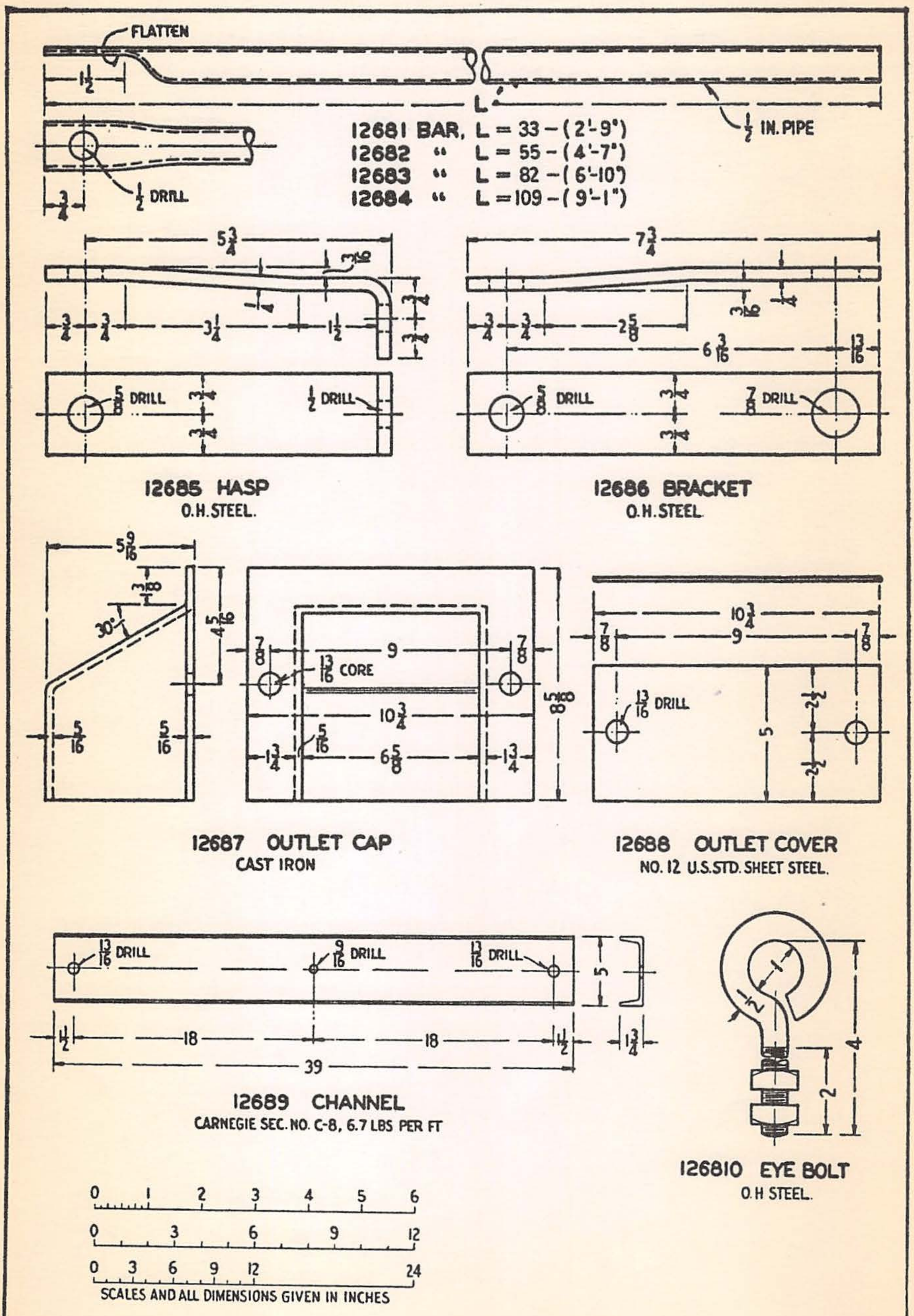
WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 3000 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.

CONCRETE BATTERY BOX

DETAILS

						M-1941	SEP. 1941	M-1939	MAR. 1939	M-1936	MAR. 1936

AAR
SIG. SEC.
1267C

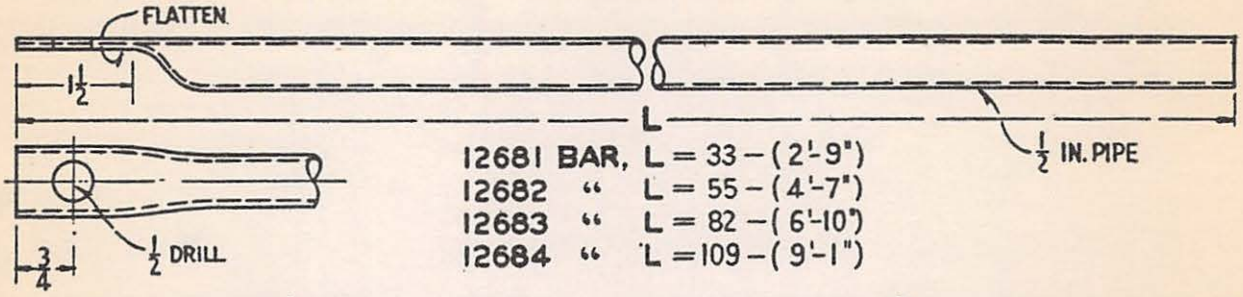

FLATTEN
1½
L
½ IN. PIPE
½ DRILL
¾
12681 BAR, L = 33 – (2'-9")
12682 " L = 55 – (4'-7")
12683 " L = 82 – (6'-10")
12684 " L = 109 – (9'-1")
5¾
¾ ¾ 3¼ 1½
⅝ DRILL
½ DRILL
12685 HASP
O.H. STEEL.
7¾
¾ ¾ 2⅝
6 3/16
13/16
⅝ DRILL
⅞ DRILL
12686 BRACKET
O.H. STEEL.
5 9/16
30°
4 5/16
5/16
12687 OUTLET CAP
CAST IRON
⅞
9
13/16 CORE
10¾
6⅝
1¾
8 5/16
12688 OUTLET COVER
NO. 12 U.S. STD. SHEET STEEL.
10¾
⅞
9
13/16 DRILL
5
2½
13/16 DRILL
9/16 DRILL
13/16 DRILL
5
1½
18
18
39
1¾
12689 CHANNEL
CARNEGIE SEC. NO. C-8, 6.7 LBS PER FT
126810 EYE BOLT
O.H STEEL.
1
½
2
4
0 1 2 3 4 5 6
0 3 6 9 12
0 3 6 9 12 24
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

CONCRETE BATTERY BOX

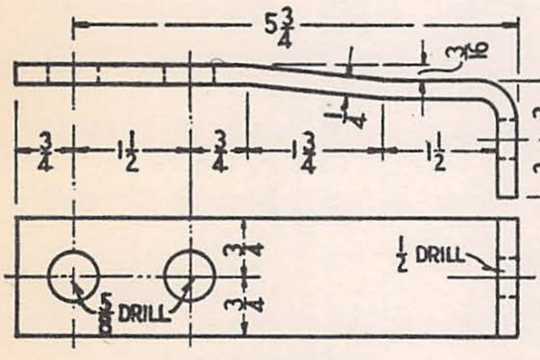
DETAILS

M-1939	MAR 1939	M-1936	MAR. 1936	AAR SIG. SEC. 1268B

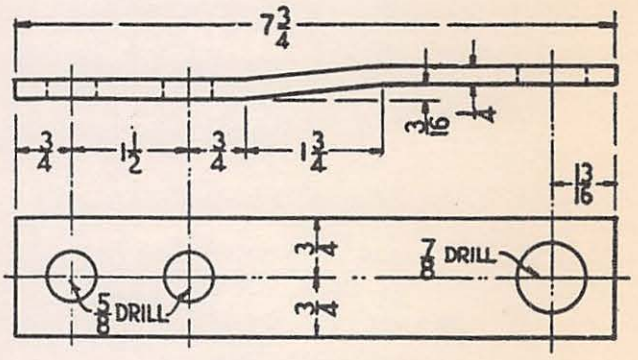
Material shall be in accordance with Specification 123 and Specification for Gray Iron Castings.


FLATTEN
1½
L
½ IN. PIPE
¾
½ DRILL

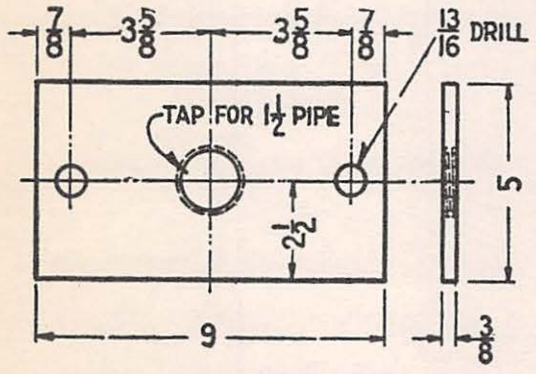
12681 BAR, L = 33 – (2'-9")
12682 " L = 55 – (4'-7")
12683 " L = 82 – (6'-10")
12684 " L = 109 – (9'-1")


5¾
3/16
¼
¾
¾
1½
¾
1¾
1½
¾
¾
½ DRILL
¾
¾
5/8 DRILL

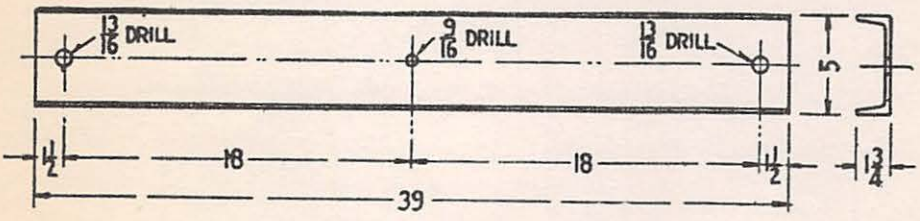
12685 HASP
SAE – 1020 STEEL


7¾
¼
3/16
¾
1½
¾
1¾
13/16
¾
¾
7/8 DRILL
5/8 DRILL

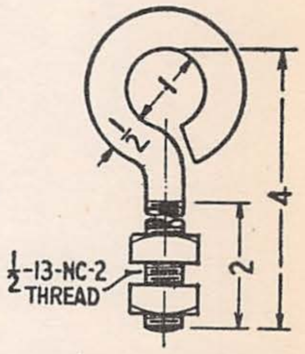
12686 BRACKET
SAE – 1020 STEEL


7/8
3⅝
3⅝
7/8
13/16 DRILL
TAP FOR 1½ PIPE
2½
5
9
3/8

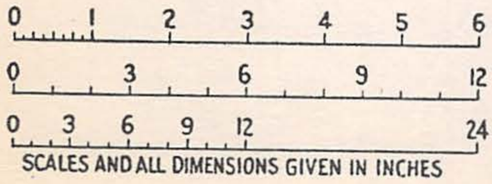
126811 OUTLET COVER
SAE – 1020 STEEL


13/16 DRILL
9/16 DRILL
13/16 DRILL
5
1½
18
18
1½
1¾
39

12689 CHANNEL
CARNEGIE SEC. NO. C-8, 6.7 LBS. PER FT.


1
½
4
2
½-13-NC-2 THREAD

126810 EYE BOLT
SAE – 1020 STEEL

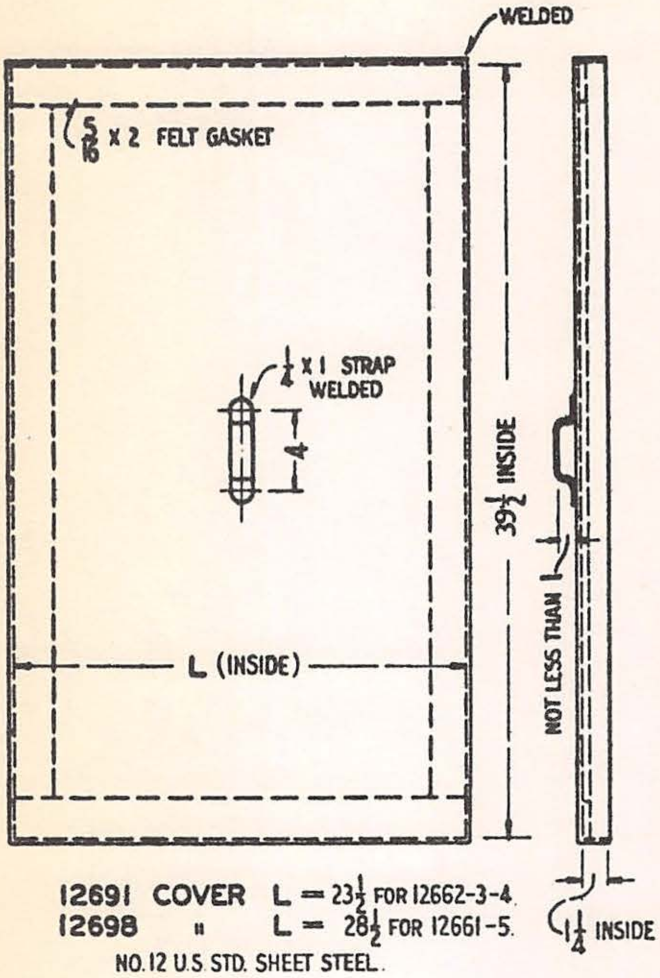

0 1 2 3 4 5 6
0 3 6 9 12
0 3 6 9 12 24

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

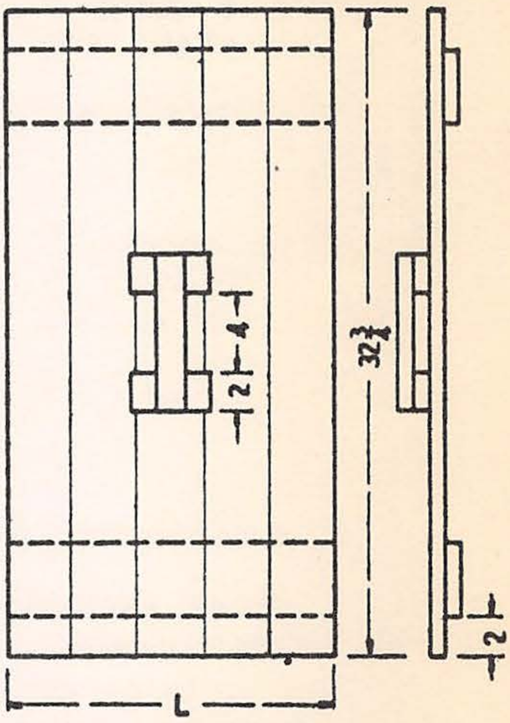
CONCRETE BATTERY BOX

DETAILS

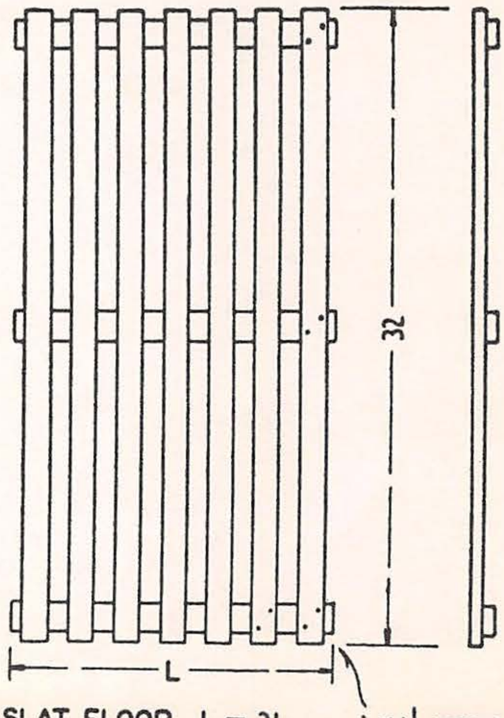
M-1941	SEP. 1941	M-1939	MAR. 1939	M-1936	MAR. 1936	AAR SIG. SEC. 1268C


WELDED
$\frac{5}{16}$ x 2 FELT GASKET
$\frac{1}{4}$ x 1 STRAP WELDED
4
39$\frac{1}{2}$ INSIDE
NOT LESS THAN 1
L (INSIDE)
1$\frac{1}{4}$ INSIDE

12691 COVER L = 23$\frac{1}{2}$ FOR 12662-3-4.
12698 " L = 28$\frac{1}{2}$ FOR 12661-5.
NO. 12 U.S. STD. SHEET STEEL.


4
2
32$\frac{3}{4}$
2
L

12692 FROST BOARD L = 21$\frac{3}{4}$
12693 " " L = 19
12694 " " L = AS REQ'D AND WITHOUT HANDLE.
$\frac{7}{8}$ T.& G. GOOD QUALITY WELL SEASONED CYPRESS, FIR OR WHITE PINE FASTENED WITH 6 d NAILS CLINCHED ON BOTTOM.



0 3 6 9 12 18
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

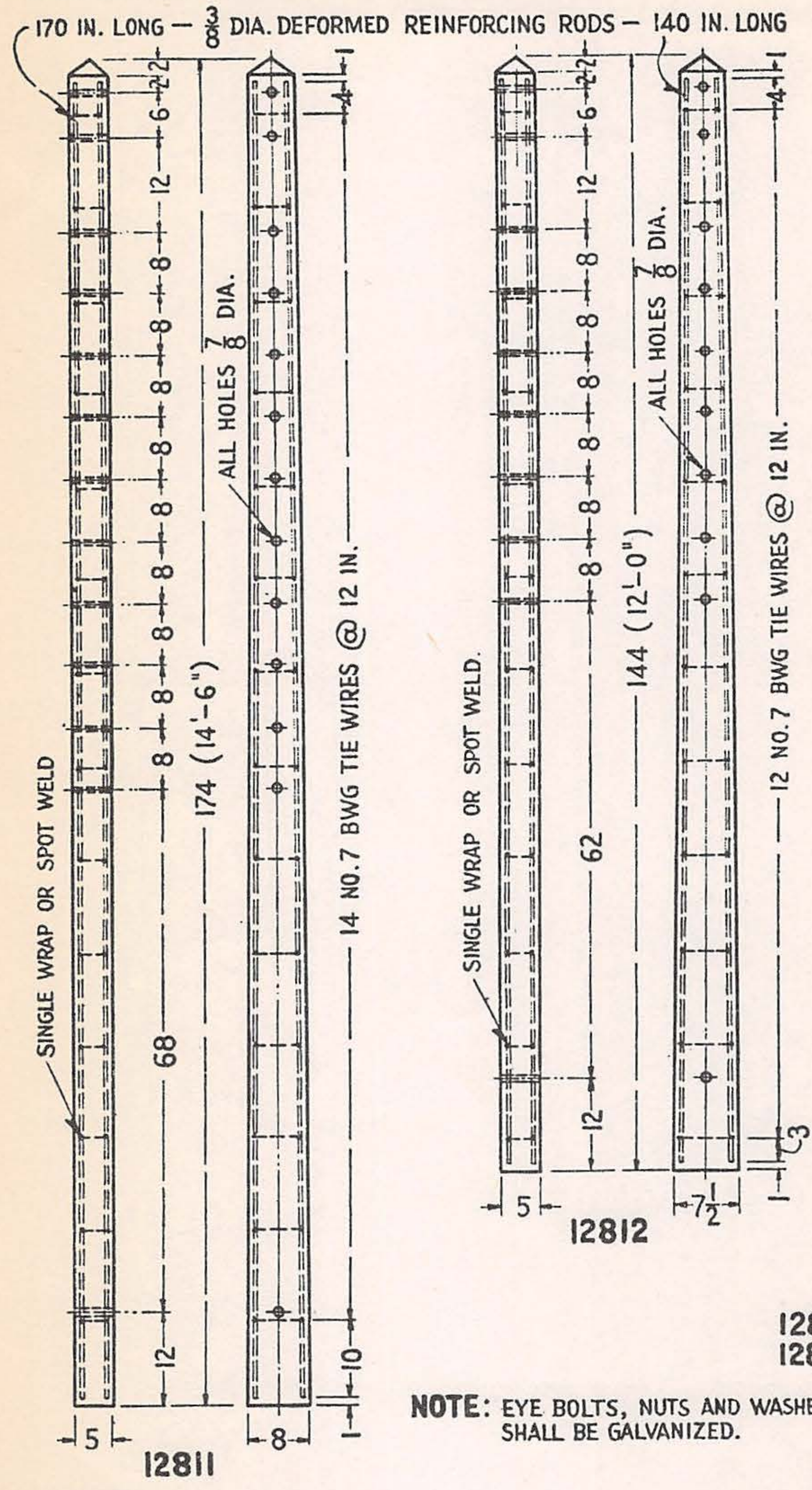
12695 SLAT FLOOR L = 21
12696 " " L = 19$\frac{1}{2}$
12697 " " L = 26

1 x 1$\frac{1}{2}$ GOOD QUALITY WELL SEASONED CYPRESS, FIR OR WHITE PINE FASTENED WITH 6 d NAILS CLINCHED ON BOTTOM

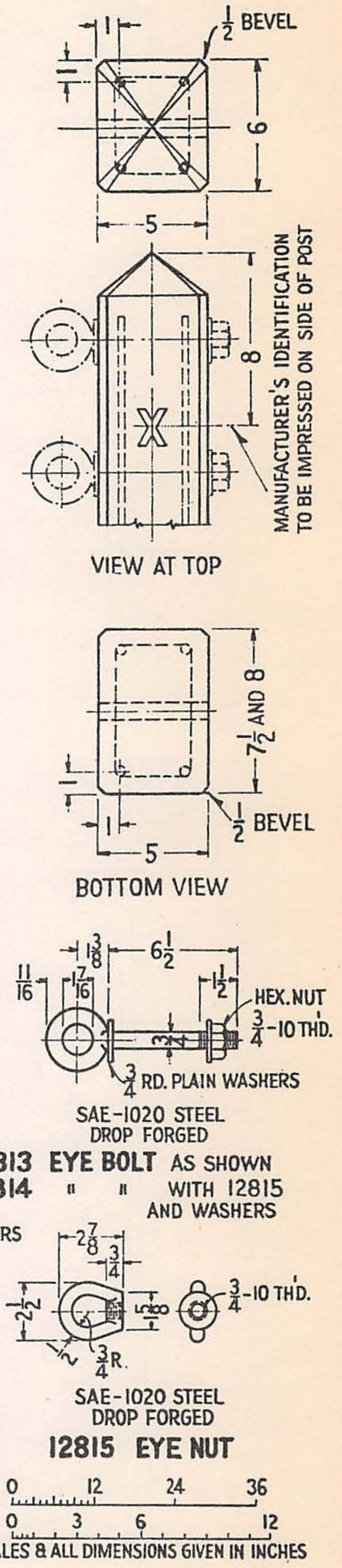
CONCRETE BATTERY BOX
DETAILS

M-1939 MAR. 1939 M-1936 MAR. 1936

AAR
SIG. SEC.
1269B


170 IN. LONG — 3/8 DIA. DEFORMED REINFORCING RODS — 140 IN. LONG
SINGLE WRAP OR SPOT WELD
ALL HOLES 7/8 DIA.
14 NO.7 BWG TIE WIRES @ 12 IN.
2 2 6 12 8 8 8 8 8 8 8 8 8 68 12
174 (14'-6")
4 10 1
5
8
12811
SINGLE WRAP OR SPOT WELD.
ALL HOLES 7/8 DIA.
12 NO.7 BWG TIE WIRES @ 12 IN.
2 2 6 12 8 8 8 8 8 8 62 12
144 (12'-0")
4 1 3 1
5
7 1/2
12812

NOTE: EYE BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.


1/2 BEVEL
1
1
6
5
VIEW AT TOP
8
X
MANUFACTURER'S IDENTIFICATION TO BE IMPRESSED ON SIDE OF POST
7 1/2 AND 8
1
1
1/2 BEVEL
5
BOTTOM VIEW
1 3/8
6 1/2
11/16
1 7/16
1 1/2
HEX. NUT
3/4-10 THD.
3/4
3/4 RD. PLAIN WASHERS
2 7/8
3/4
2 1/2
5/8
1 1/8
3/4-10 THD.
1/2
3/4 R.
0 12 24 36
0 3 6 12
SCALES & ALL DIMENSIONS GIVEN IN INCHES

SAE-1020 STEEL
DROP FORGED

12813 EYE BOLT AS SHOWN
12814 " " WITH 12815 AND WASHERS

SAE-1020 STEEL
DROP FORGED

12815 EYE NUT

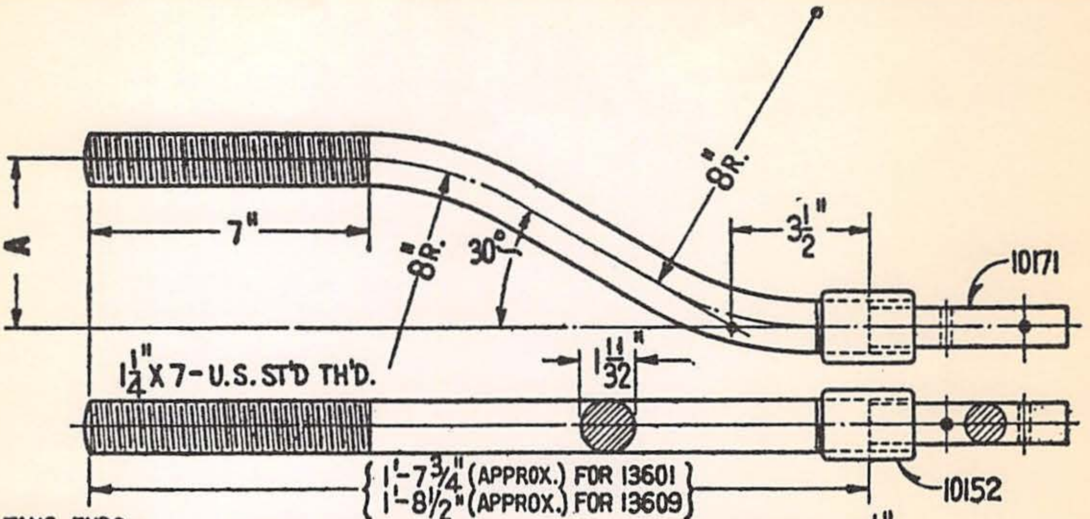
CONCRETE:

PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION SHALL BE USED.
COARSE AGGREGATE SHALL CONSIST OF 3/4 IN. MAXIMUM SIZE STONE OR GRAVEL.
NOT LESS THAN 7 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
WATER CONTENT PER 94 LB. SACK OF CEMENT SHALL NOT EXCEED 6 GALLONS.
COMPRESSIVE STRENGTH AFTER 28 DAYS SHALL NOT BE LESS THAN 3750 LBS. PER SQUARE INCH.
HIGH FREQUENCY VIBRATOR SHALL BE USED IN COMPACTING CONCRETE.

CONCRETE POSTS

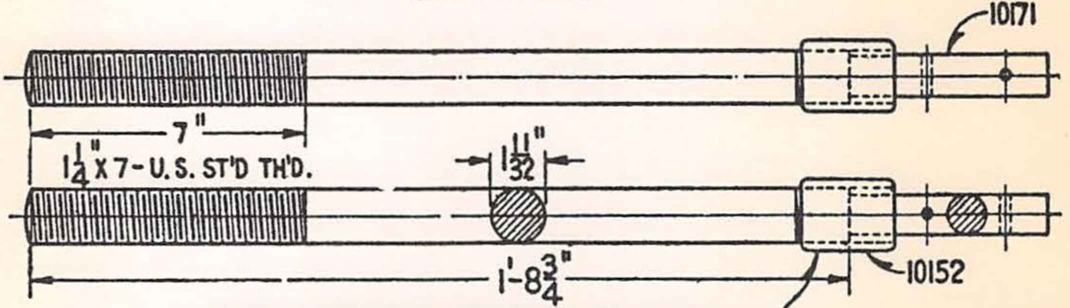
M-1942 OCT. 1942

AAR
SIG. SEC.
1281A


8"R.
A
7"
8"R.
30°
3½"
10171
1¼" X 7 - U.S. ST'D TH'D.
1 11/32"
{ 1'-7¾" (APPROX.) FOR 13601 }
{ 1'-8½" (APPROX.) FOR 13609 }
10152

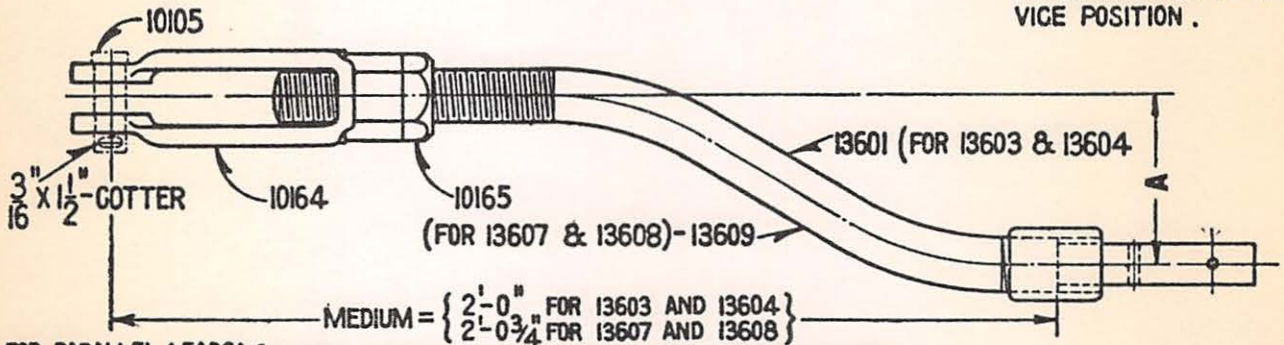
NOTE: OFFSET TANG ENDS 13601 AND 13609 SHALL BE FORMED FROM STRAIGHT TANG END 13602.

13601 OFFSET THREADED TANG END – A = 4¼"
13609 " " " " – A = 1¼"
(O. H. STEEL)

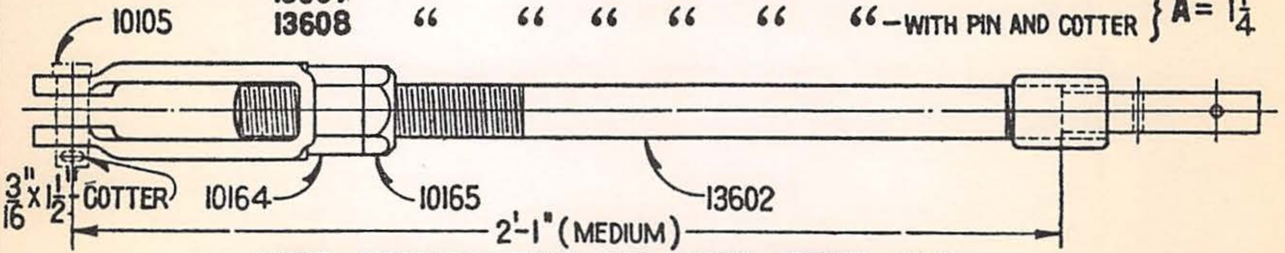

10171
7"
1¼" X 7 - U.S. ST'D TH'D.
1 11/32"
1'-8¾"
10152

13602 STRAIGHT THREADED TANG END
(O. H. STEEL)

NOTE: COUPLINGS SHALL BE SCREWED ON TO SERVICE POSITION.


10105
3/16" X 1½" - COTTER
10164
10165
13601 (FOR 13603 & 13604
(FOR 13607 & 13608) - 13609
A
MEDIUM = { 2'-0" FOR 13603 AND 13604 }
{ 2'-0¾" FOR 13607 AND 13608 }

FOR PARALLEL LEADS, GROUND MAST SIGNALS 1043-1044 { **13603 OFFSET TANG END WITH SCREW JAW**
13604 " " " " " " – WITH PIN AND COTTER } **A = 4¼"**
13607 " " " " " "
13608 " " " " " " – WITH PIN AND COTTER } **A = 1¼"**


10105
3/16" X 1½" - COTTER
10164
10165
13602
2'-1" (MEDIUM)

13605 STRAIGHT TANG END WITH SCREW JAW
13606 " " " " " " – WITH PIN AND COTTER.

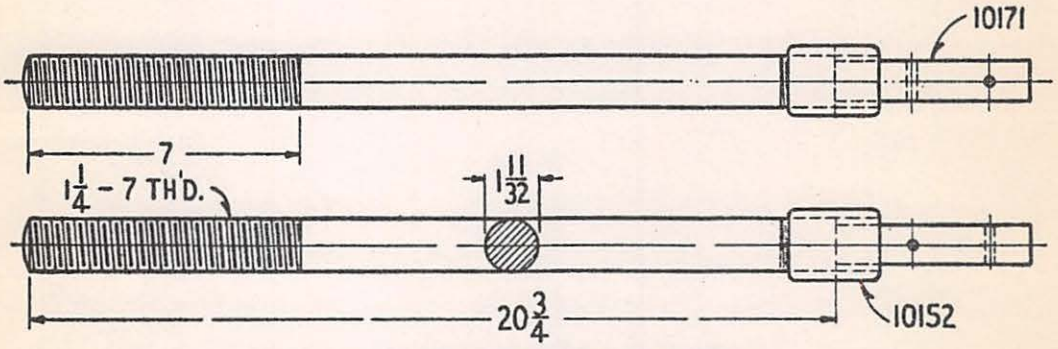
0 3 6 9 12
SCALE OF INCHES

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

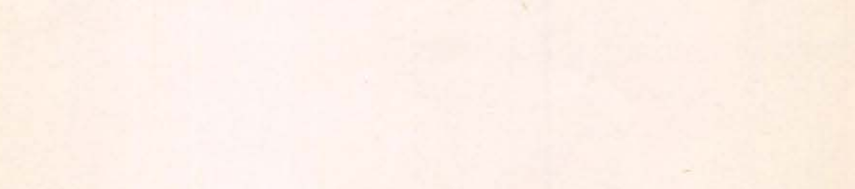
TANG ENDS WITH SCREW JAWS

DEC. 1915 | SEP. 1915 | MAY 1915

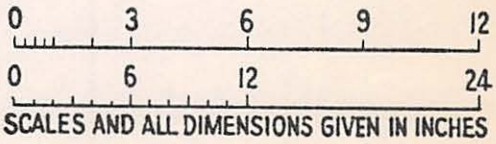
RSA 1360


10171
7
1¼ - 7 TH'D.
1 11/32
20¾
10152

13602 STRAIGHT THREADED TANG END
SAE-1020 STEEL


10164
ASA HEAVY SEMI-FINISHED HEX. NUT
13602
25 (MEDIUM)

13605 STRAIGHT TANG END WITH SCREW JAW

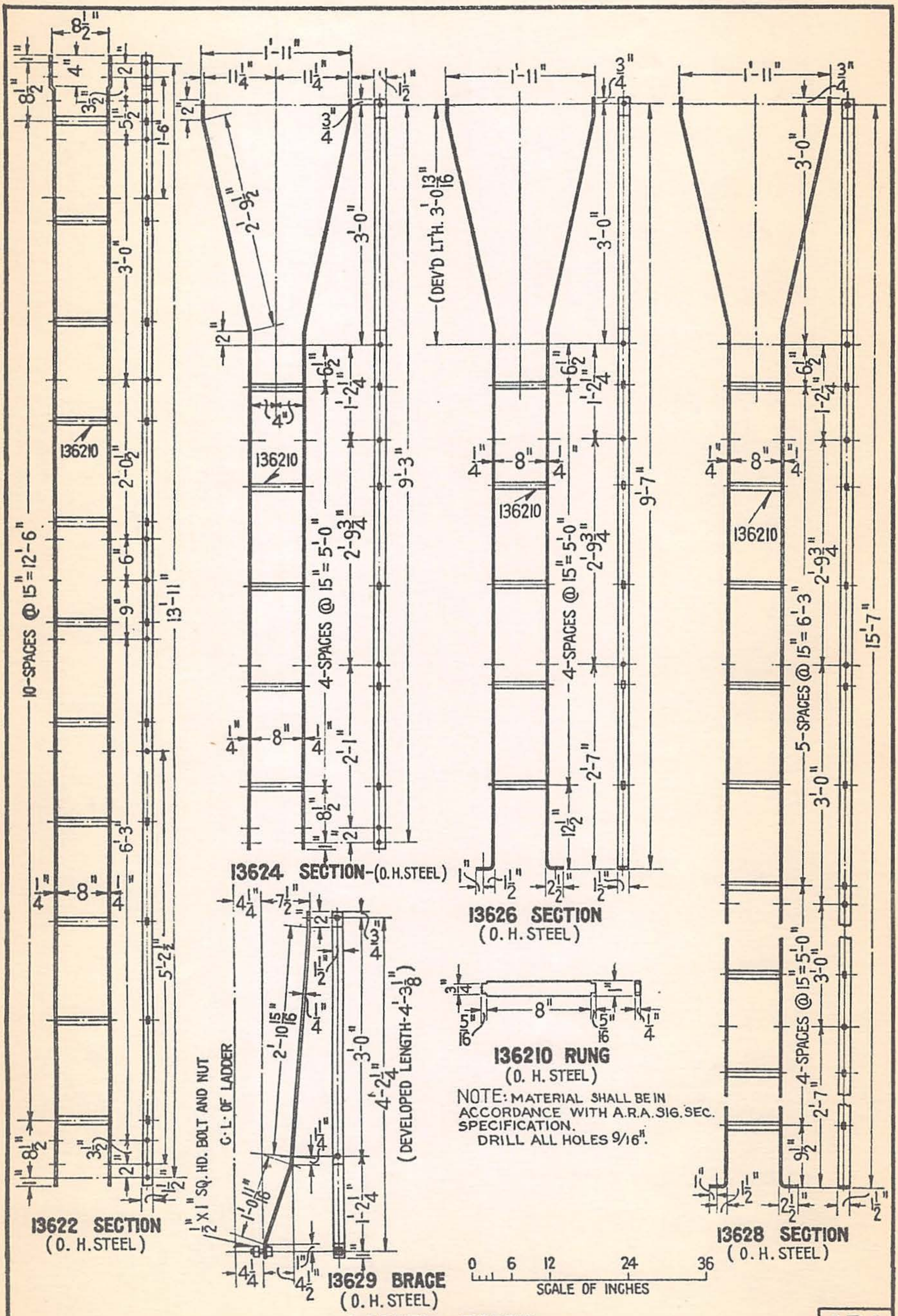

0
3
6
9
12
0
6
12
24

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

TANG END WITH SCREW JAW

M-1941 | SEP. 1941 | DEC. 1915 | SEP. 1915 | MAY 1915

AAR
SIG.SEC.
1360B


8 1/2"
1'-11"
11 1/4"
11 1/4"
10-SPACES @ 15" = 12'-6"
13'-11"
1'-6"
3'-0"
2'-0 1/2"
6'-3"
5'-2 1/2"
136210
2'-9 1/2"
3'-0"
4-SPACES @ 15" = 5'-0"
2'-9 3/4"
2'-1"
9'-3"
(DEV'D LTH. 3'-0 13/16")
9'-7"
2'-7"
5-SPACES @ 15" = 6'-3"
4-SPACES @ 15" = 5'-0"
15'-7"
8"
1/2" X 1" SQ. HD. BOLT AND NUT
C·L· OF LADDER
2'-10 15/16"
1'-0 11/16"
4'-2 1/4"
(DEVELOPED LENGTH-4'-3 1/8")
0
6
12
24
36
SCALE OF INCHES

13622 SECTION
(O. H. STEEL)

13624 SECTION-(O.H.STEEL)

13626 SECTION
(O. H. STEEL)

13628 SECTION
(O. H. STEEL)

13629 BRACE
(O. H. STEEL)

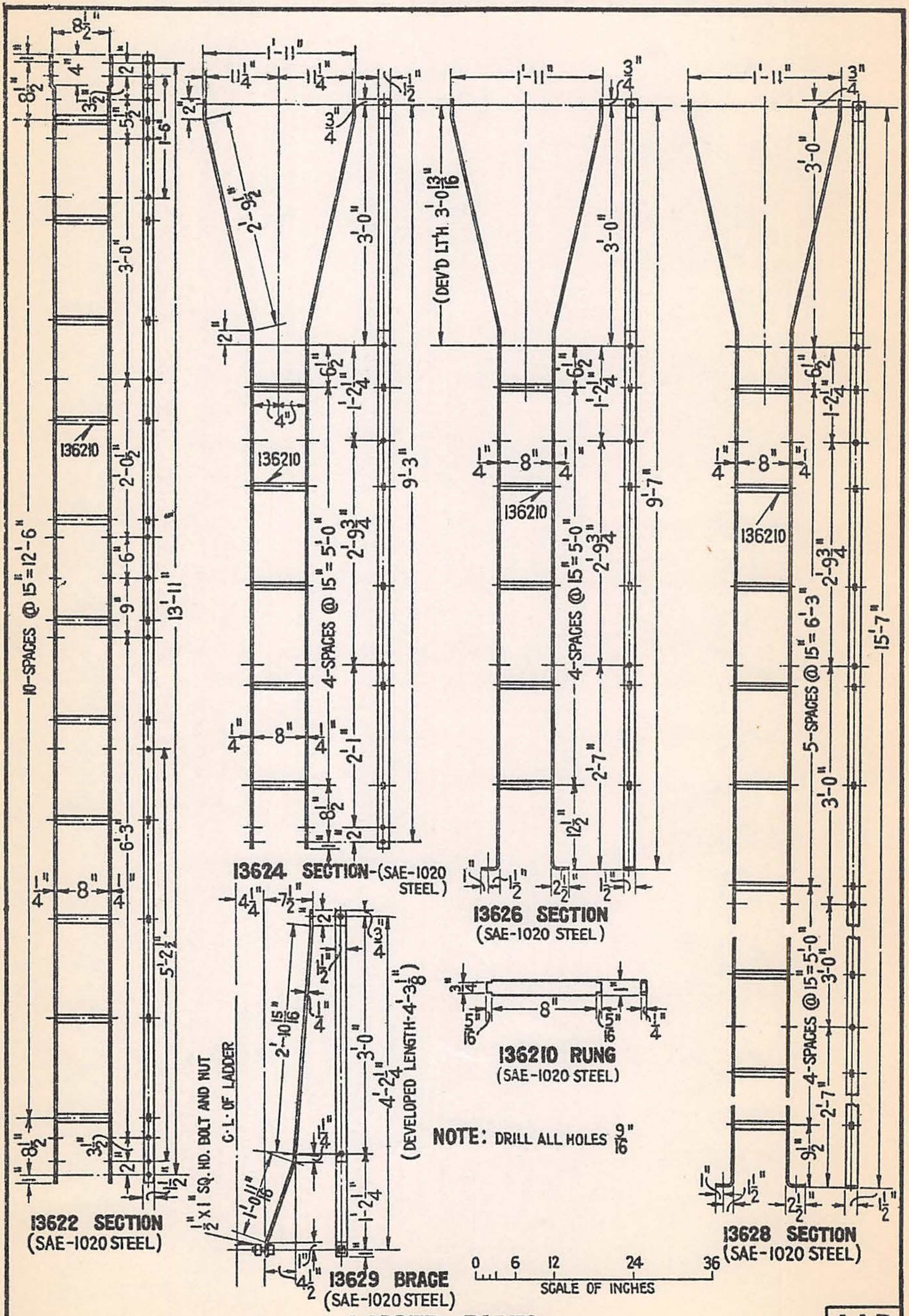
136210 RUNG
(O. H. STEEL)

NOTE: MATERIAL SHALL BE IN ACCORDANCE WITH A.R.A. SIG. SEC. SPECIFICATION.
DRILL ALL HOLES 9/16".

LADDER PARTS
(DETAILS)

ARA
SIG. SEC.
1362B

								M-1926	SEP. 1925	DEC. 1918	MAR. 1918

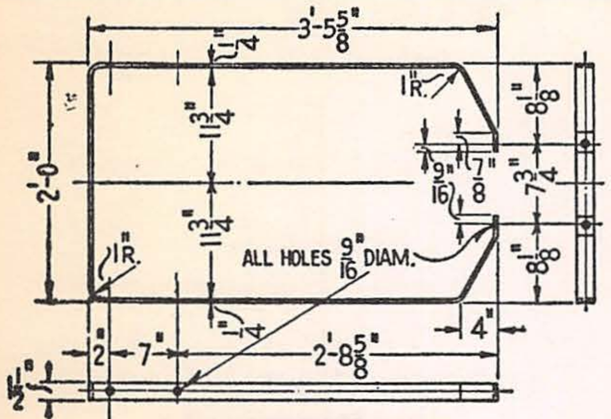

13622 SECTION (SAE-1020 STEEL)
10-SPACES @ 15" = 12'-6"
136210
13624 SECTION-(SAE-1020 STEEL)
4-SPACES @ 15" = 5'-0"
(DEV'D LT'H. 3'-0 13/16")
13626 SECTION (SAE-1020 STEEL)
13628 SECTION (SAE-1020 STEEL)
5-SPACES @ 15" = 6'-3"
4-SPACES @ 15" = 5'-0"
136210 RUNG (SAE-1020 STEEL)
13629 BRACE (SAE-1020 STEEL)
(DEVELOPED LENGTH-4'-3 1/8")
1/2" X 1" SQ. HD. BOLT AND NUT
C·L· OF LADDER
NOTE: DRILL ALL HOLES 9/16"
0 6 12 24 36
SCALE OF INCHES

LADDER PARTS

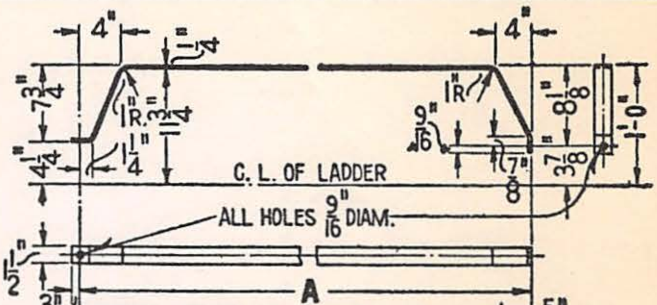
(DETAILS)

						M-1941	SEP. 1941	M-1926	SEP. 1925	DEC. 1918	MAR. 1918

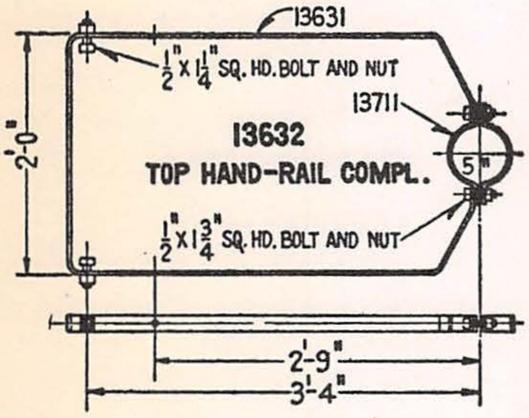
AAR
SIG. SEC.
1362C

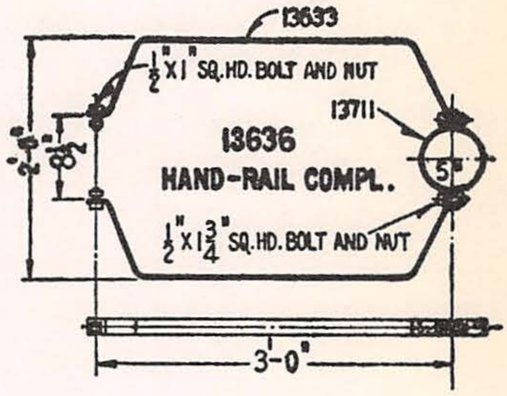

3'-5 5/8"
1/4"
1" R.
11 3/4"
11 3/4"
8 1/8"
7 3/4"
8 1/8"
9/16"
7/8"
2'-0"
1" R.
ALL HOLES 9/16" DIAM.
1/4"
4"
2"
7"
2'-8 5/8"
1/2"

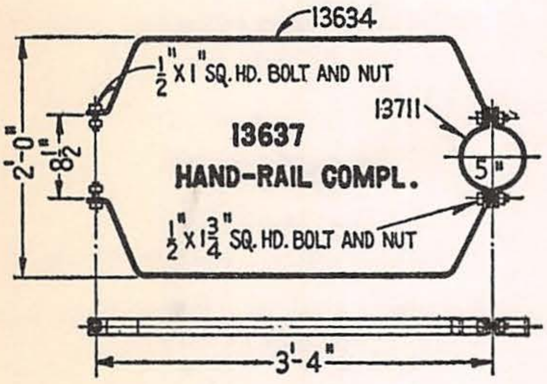
13631 TOP HAND-RAIL
(O. H. STEEL)

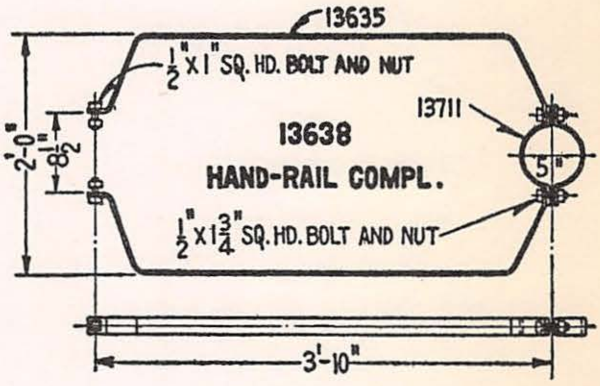

4"
4"
1/4"
7 3/4"
1" R.
11 3/4"
1 1/4"
4 1/4"
1" R.
9/16"
7/8"
8 1/8"
3 7/8"
1'-0"
C. L. OF LADDER
ALL HOLES 9/16" DIAM.
1/2"
A
3/4"

13633 HAND-RAIL SIDE – A = 2'-11 5/8"
13634 " " – A = 3'-3 5/8"
13635 " " – A = 3'-9 5/8"
(O. H. STEEL)


13631
1/2" X 1 1/4" SQ. HD. BOLT AND NUT
13711
2'-0"
13632
TOP HAND-RAIL COMPL.
5"
1/2" X 1 3/4" SQ. HD. BOLT AND NUT
2'-9"
3'-4"


13633
1/2" X 1" SQ. HD. BOLT AND NUT
13711
2'-0"
8 1/2"
13636
HAND-RAIL COMPL.
5"
1/2" X 1 3/4" SQ. HD. BOLT AND NUT
3'-0"


13634
1/2" X 1" SQ. HD. BOLT AND NUT
13711
2'-0"
8 1/2"
13637
HAND-RAIL COMPL.
5"
1/2" X 1 3/4" SQ. HD. BOLT AND NUT
3'-4"


13635
1/2" X 1" SQ. HD. BOLT AND NUT
13711
2'-0"
8 1/2"
13638
HAND-RAIL COMPL.
5"
1/2" X 1 3/4" SQ. HD. BOLT AND NUT
3'-10"

0 3 6 9 12 24 36
SCALE OF INCHES

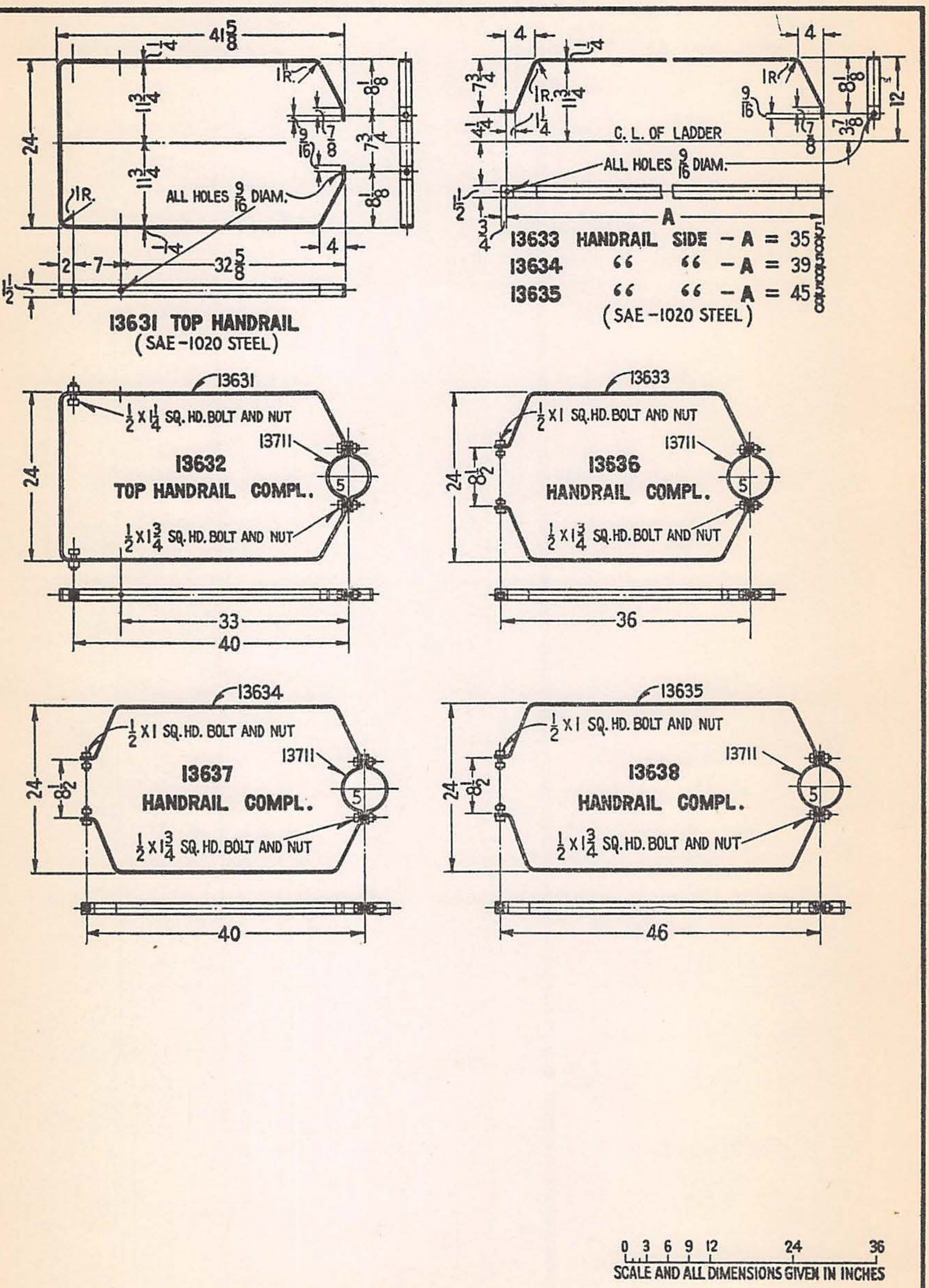
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

LADDER HAND-RAILS
(DETAILS AND ASSEMBLY)

MAR.1918

RSA
1363

See 1362, 1364, 1365, 1366 and 1371.

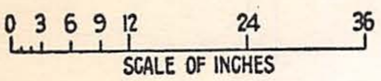

41 5/8
1/4
1R.
8 1/8
11 3/4
24
9/16
7/8
7 3/4
ALL HOLES 9/16 DIAM.
1R.
4
2
7
32 5/8
1/2
13631 TOP HANDRAIL
(SAE-1020 STEEL)
4
4
1/4
7 3/4
1R.
11 3/4
4 1/4
1 1/4
C. L. OF LADDER
1R
9/16
7/8
8 1/8
12
3 7/8
ALL HOLES 9/16 DIAM.
1/2
A
3/4
13633 HANDRAIL SIDE — A = 35 5/8
13634 " " — A = 39 5/8
13635 " " — A = 45 5/8
(SAE-1020 STEEL)
13631
1/2 X 1 1/4 SQ. HD. BOLT AND NUT
13711
13632
TOP HANDRAIL COMPL.
5
1/2 X 1 3/4 SQ. HD. BOLT AND NUT
24
33
40
13633
1/2 X 1 SQ. HD. BOLT AND NUT
13711
13636
HANDRAIL COMPL.
5
1/2 X 1 3/4 SQ. HD. BOLT AND NUT
24
8 1/2
36
13634
1/2 X 1 SQ. HD. BOLT AND NUT
13711
13637
HANDRAIL COMPL.
5
1/2 X 1 3/4 SQ. HD. BOLT AND NUT
24
8 1/2
40
13635
1/2 X 1 SQ. HD. BOLT AND NUT
13711
13638
HANDRAIL COMPL.
5
1/2 X 1 3/4 SQ. HD. BOLT AND NUT
24
8 1/2
46
0 3 6 9 12 24 36
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

LADDER HANDRAILS
(DETAILS AND ASSEMBLY)

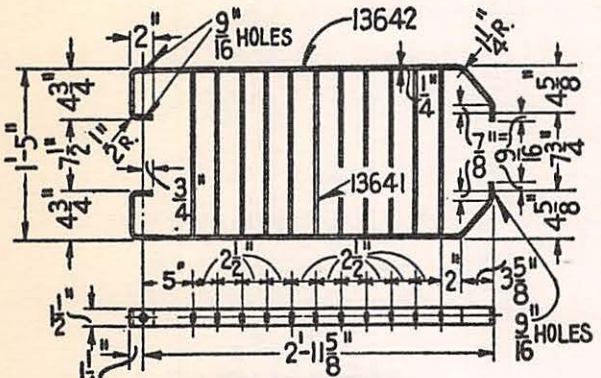
M-1941 | SEP.1941 | MAR.1918

AAR
SIG.SEC.
1363B

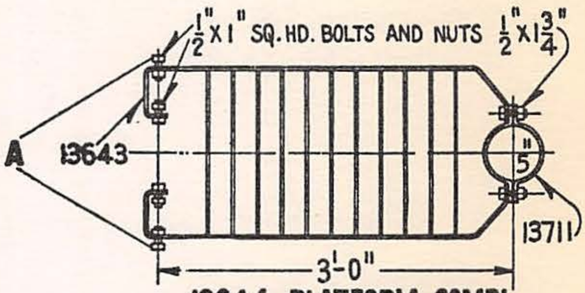
See 1362, 1364, 1365, 1366 and 1371.


0 3 6 9 12 24 36
SCALE OF INCHES

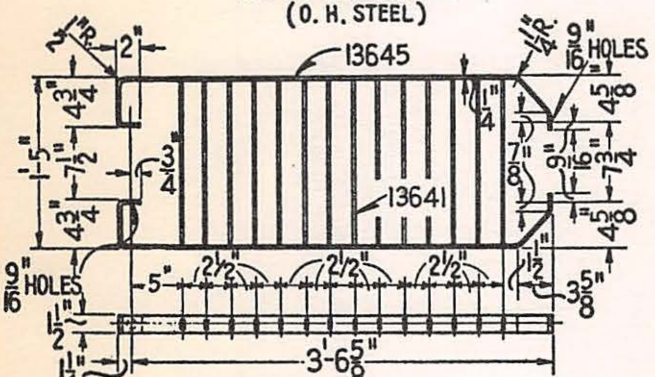
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.


13642
13641
9/16" HOLES
2"
1/4"R.
3/4"R.
1'-5"
4 3/4"
7 1/2"
3/4"
1/4"
4 5/8"
7 3/4"
7/8"
9/16"
5"
2 1/2"
2"
3 5/8"
1/2"
1 1/4"
2'-11 5/8"

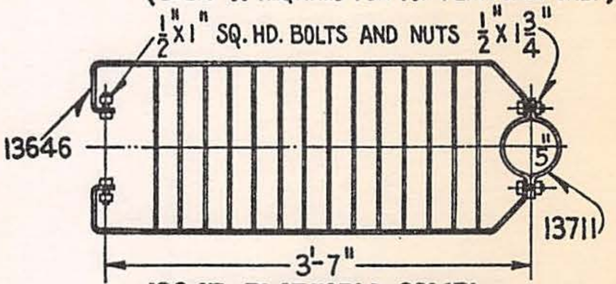
13643 PLATFORM
(O. H. STEEL)


1/2" X 1" SQ. HD. BOLTS AND NUTS 1/2" X 1 3/4"
A
13643
5"
13711
3'-0"

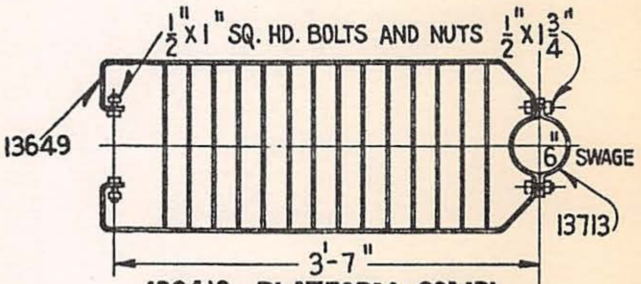
13644 PLATFORM COMPL.
(BOLTS "A" REQUIRED FOR TOP PLATFORM ONLY)


13645
13641
1/4"R.
2"
9/16" HOLES
1'-5"
4 3/4"
7 1/2"
3/4"
1/4"
4 5/8"
7 3/4"
7/8"
9/16"
5"
2 1/2"
1 1/2"
3 5/8"
1/2"
1/4"
3'-6 5/8"

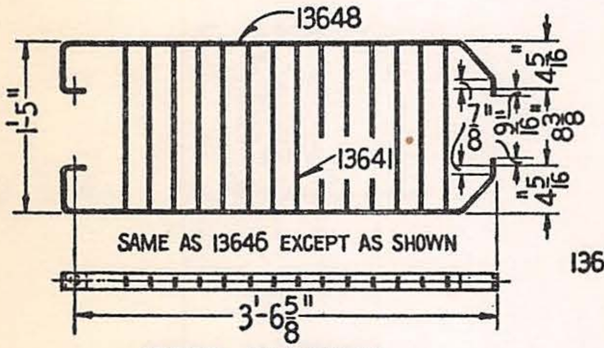
13646 PLATFORM
(O. H. STEEL)


1/2" X 1" SQ. HD. BOLTS AND NUTS 1/2" X 1 3/4"
13646
5"
13711
3'-7"

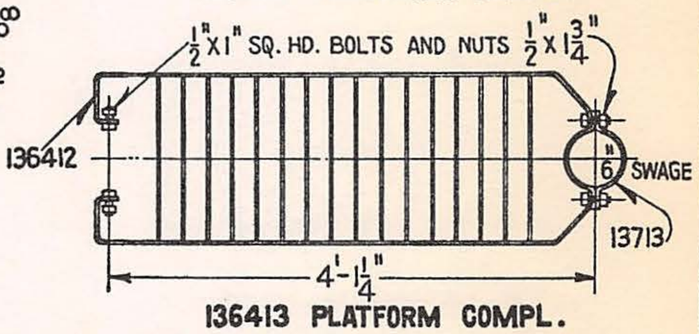
13647 PLATFORM COMPL.


1/2" X 1" SQ. HD. BOLTS AND NUTS 1/2" X 1 3/4"
13649
6" SWAGE
13713
3'-7"

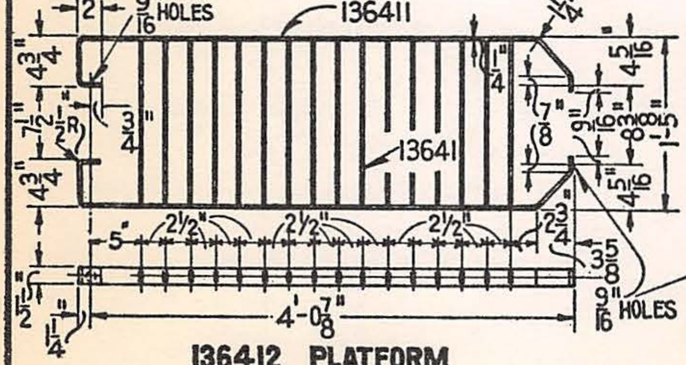
136410 PLATFORM COMPL.


13648
13641
1'-5"
4 5/16"
7/8"
9/16"
8 3/8"
SAME AS 13646 EXCEPT AS SHOWN
3'-6 5/8"

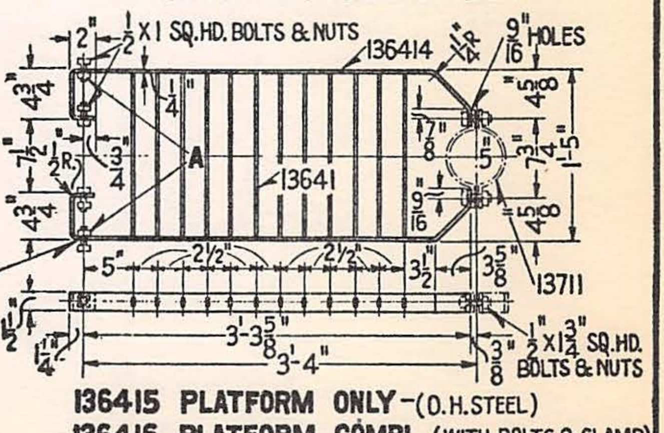
13649 PLATFORM
(O. H. STEEL)


1/2" X 1" SQ. HD. BOLTS AND NUTS 1/2" X 1 3/4"
136412
6" SWAGE
13713
4'-1 1/4"

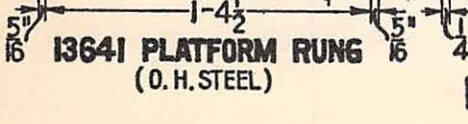
136413 PLATFORM COMPL.


136411
13641
2"
9/16" HOLES
1/4"R.
4 3/4"
7 1/2"
3/4"R.
3/4"
1/4"
4 5/16"
7/8"
9/16"
8 3/8"
1'-5"
5"
2 1/2"
2 3/4"
3 5/8"
1/2"
1/4"
4'-0 7/8"

136412 PLATFORM
(O. H. STEEL)


2"
1/2" X 1 SQ.HD. BOLTS & NUTS
136414
1/4"R.
9/16" HOLES
4 3/4"
7 1/2"
3/4"R.
1/4"
3/4"
A
13641
7/8"
9/16"
5"
4 5/8"
7 3/4"
1'-5"
2 1/2"
3 1/2"
3 5/8"
13711
1/2"
1/4"
3'-3 5/8"
3'-4"
3/8"
1/2" X 1 3/4" SQ.HD. BOLTS & NUTS

136415 PLATFORM ONLY-(O.H.STEEL)
136416 PLATFORM COMPL.(WITH BOLTS & CLAMP)
(BOLTS "A" REQUIRED FOR TOP PLATFORM ONLY)

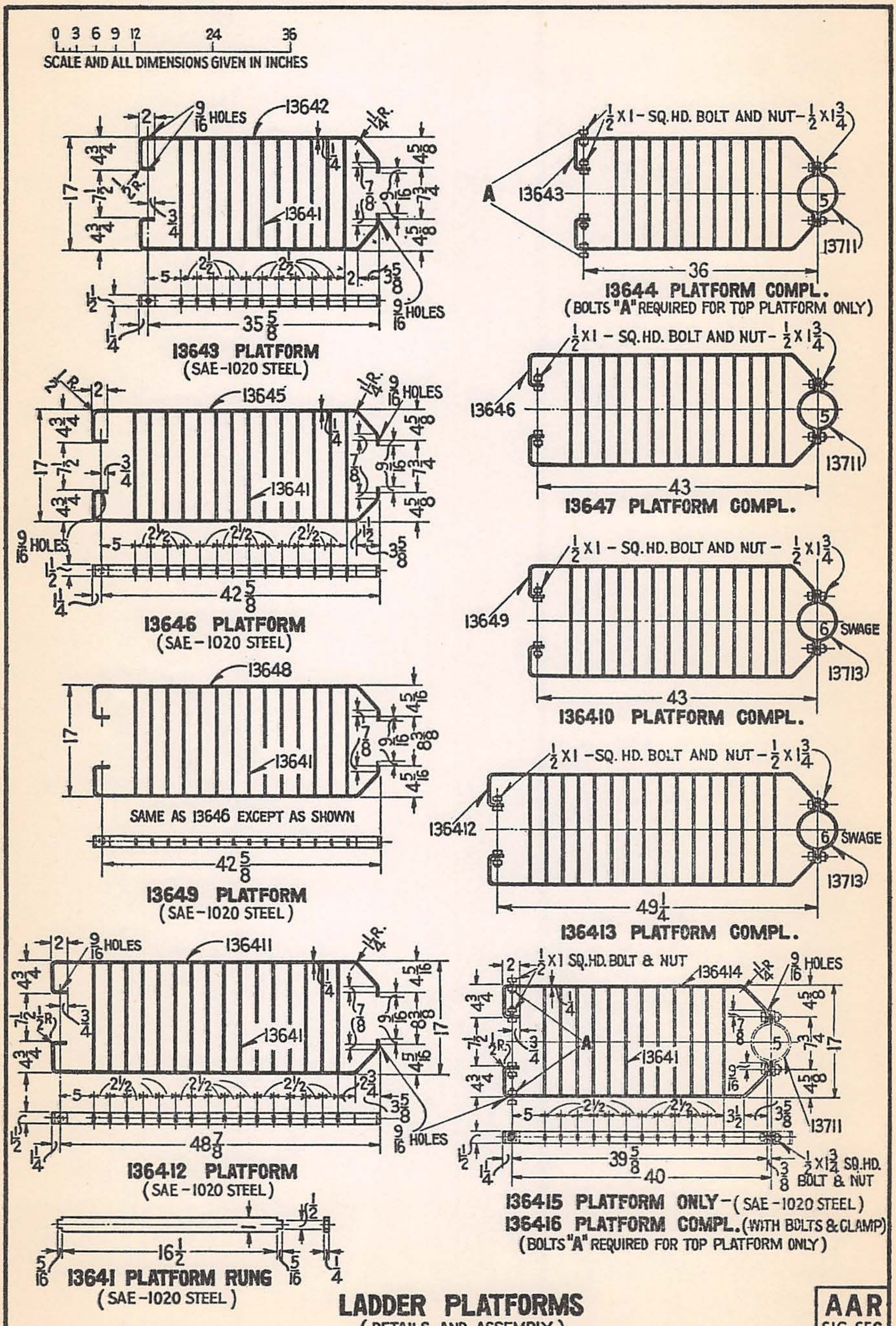

1/2"
1'-4 1/2"
5/16"
5/16"
1/4"

13641 PLATFORM RUNG
(O. H. STEEL)

LADDER PLATFORMS
(DETAILS AND ASSEMBLY)

M-1934	MAR 1934	MAR. 1918	ARA SIG. SEC. 1364B

See 1362, 1363, 1365, 1366 and 1371.


0 3 6 9 12 24 36
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
13642
13641
9/16 HOLES
1/4 R.
1/2 R.
13643 PLATFORM
(SAE-1020 STEEL)
35 5/8
A
13643
1/2 X 1 - SQ. HD. BOLT AND NUT - 1/2 X 1 3/4
13711
36
13644 PLATFORM COMPL.
(BOLTS "A" REQUIRED FOR TOP PLATFORM ONLY)
13645
13646 PLATFORM
(SAE-1020 STEEL)
42 5/8
13646
43
13647 PLATFORM COMPL.
13648
SAME AS 13646 EXCEPT AS SHOWN
13649 PLATFORM
(SAE-1020 STEEL)
13649
6 SWAGE
13713
136410 PLATFORM COMPL.
136411
136412 PLATFORM
(SAE-1020 STEEL)
48 7/8
136412
49 1/4
136413 PLATFORM COMPL.
1/2 X 1 SQ. HD. BOLT & NUT
136414
39 5/8
40
1/2 X 1 3/4 SQ. HD. BOLT & NUT
136415 PLATFORM ONLY - (SAE-1020 STEEL)
136416 PLATFORM COMPL. (WITH BOLTS & CLAMP)
(BOLTS "A" REQUIRED FOR TOP PLATFORM ONLY)
16 1/2
13641 PLATFORM RUNG
(SAE-1020 STEEL)

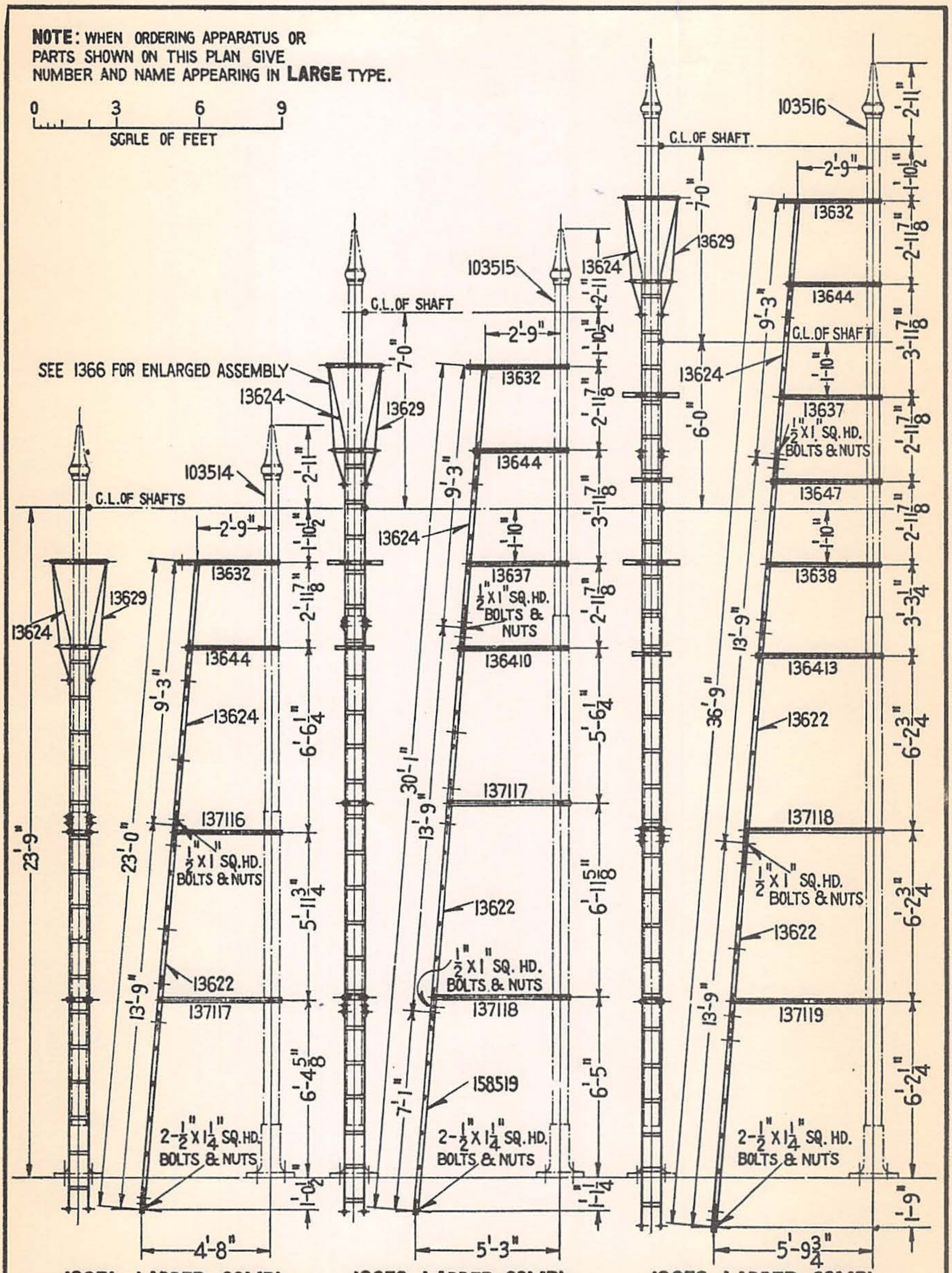
LADDER PLATFORMS
(DETAILS AND ASSEMBLY)

AAR
SIG. SEC.
1364C

M-1941 | SEP. 1941 | M-1934 | MAR 1934 | MAR. 1918

See 1362, 1363, 1365, 1366 and 1371.

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.


0
3
6
9
SCALE OF FEET
C.L. OF SHAFTS
13624
13629
23'-9"
23'-0"
9'-3"
13'-9"
103514
2'-9"
13632
13644
13624
137116
1/2" X 1" SQ.HD. BOLTS & NUTS
13622
137117
2-1/2" X 1 1/4" SQ.HD. BOLTS & NUTS
2'-11"
1'-10 1/2"
2'-11 7/8"
6'-6 1/4"
5'-11 3/4"
6'-4 5/8"
1'-0 1/2"
4'-8"
SEE 1366 FOR ENLARGED ASSEMBLY
13624
13629
C.L. OF SHAFT
7'-0"
13624
30'-1"
9'-3"
13'-9"
7'-1"
103515
2'-9"
13632
13644
1'-10"
13637
1/2" X 1" SQ.HD. BOLTS & NUTS
136410
137117
13622
1/2" X 1" SQ. HD. BOLTS & NUTS
137118
158519
2-1/2" X 1 1/4" SQ.HD. BOLTS & NUTS
13624
2'-11"
1'-10 1/2"
2'-11 7/8"
3'-11 7/8"
2'-11 7/8"
5'-6 1/4"
6'-11 5/8"
6'-5"
1'-1 1/4"
5'-3"
C.L. OF SHAFT
7'-0"
13629
13624
6'-0"
36'-9"
9'-3"
13'-9"
13'-9"
103516
2'-9"
13632
13644
C.L. OF SHAFT
1'-10"
13637
1/2" X 1" SQ. HD. BOLTS & NUTS
13647
1'-10"
13638
136413
13622
137118
1/2" X 1" SQ.HD. BOLTS & NUTS
13622
137119
2-1/2" X 1 1/4" SQ. HD. BOLTS & NUTS
2'-11"
1'-10 1/2"
2'-11 7/8"
3'-11 7/8"
2'-11 7/8"
2'-11 7/8"
3'-3 1/4"
6'-2 3/4"
6'-2 3/4"
6'-2 1/4"
1'-9"
5'-9 3/4"

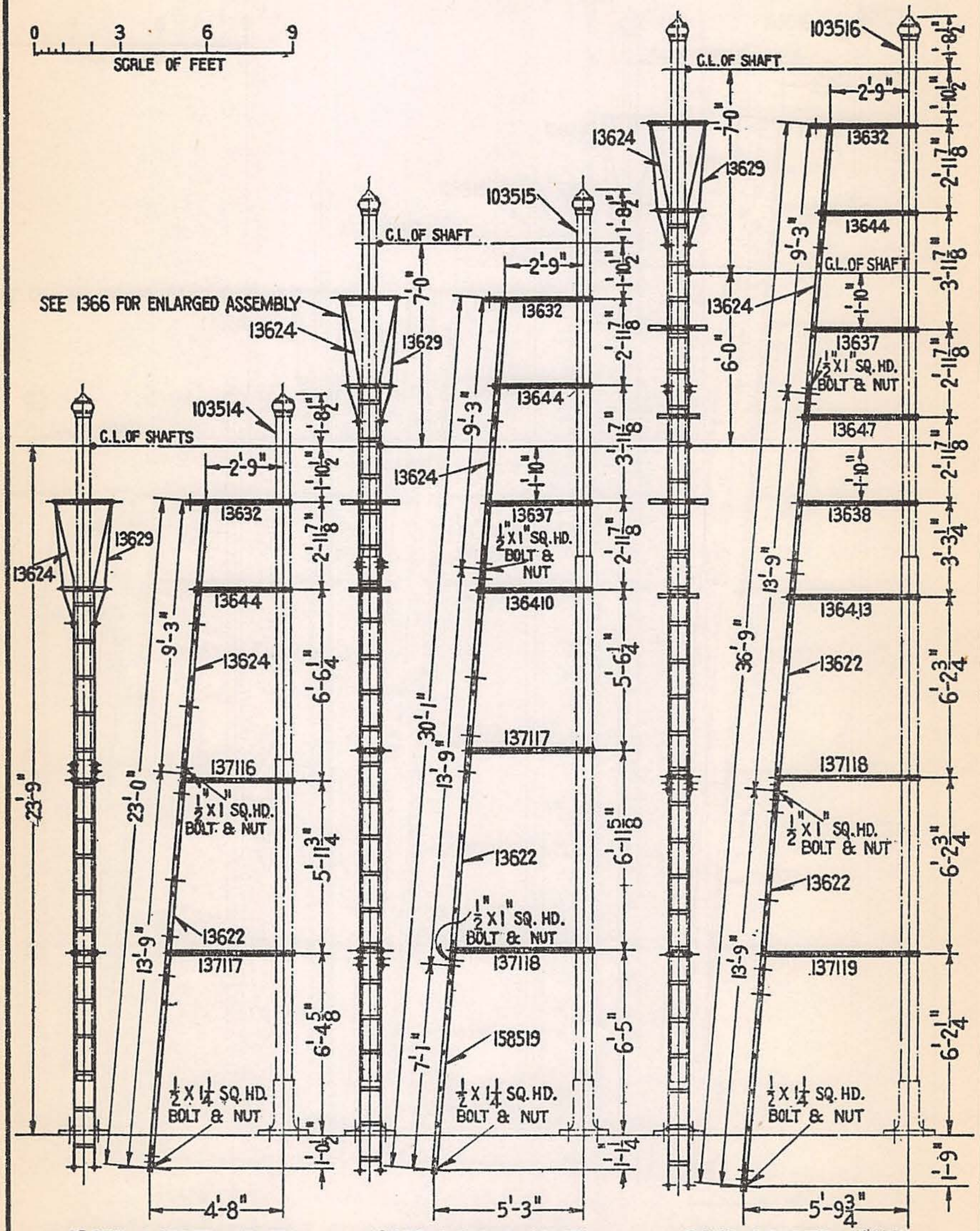
13651 LADDER COMPL. **13652 LADDER COMPL.** **13653 LADDER COMPL.**

LADDERS FOR GROUND MAST SIGNALS
(ASSEMBLY)

AAR
SIG. SEC.
1365B

M-1936 | MAR 1936 | MAR. 1918 | JUN. 1917 | MAR. 1917

See 1362, 1363, 1364, 1366 and 1371.


0 3 6 9
SCALE OF FEET
C.L. OF SHAFTS
C.L. OF SHAFT
C.L. OF SHAFT
C.L. OF SHAFT
SEE 1366 FOR ENLARGED ASSEMBLY
103514
103515
103516
13624
13629
13632
13644
13622
13637
13638
136410
13647
136413
137116
137117
137118
137119
158519
½" X 1" SQ. HD. BOLT & NUT
½ X 1¼ SQ. HD. BOLT & NUT
23'-9"
23'-0"
30'-1"
36'-9"
9'-3"
13'-9"
7'-0"
6'-0"
7'-1"
2'-9"
1'-8½"
1'-10½"
2'-11⅞"
3'-11⅞"
1'-10"
6'-6¼"
5'-11¾"
6'-4⅝"
1'-0½"
5'-6¼"
6'-11⅝"
6'-5"
1'-1¼"
3'-3¼"
6'-2¾"
6'-2¼"
1'-9"
4'-8"
5'-3"
5'-9¾"

13651 LADDER COMPL. **13652 LADDER COMPL.** **13653 LADDER COMPL.**

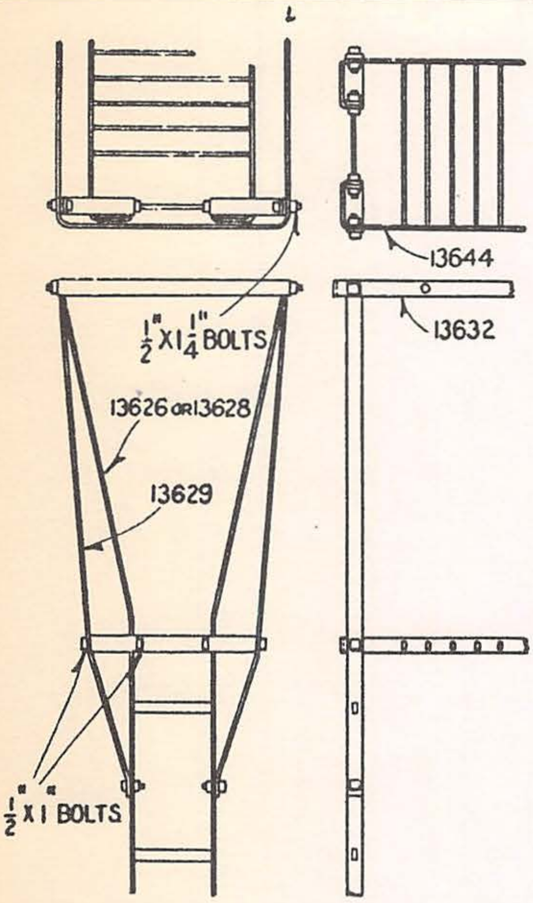
LADDERS FOR GROUND MAST SIGNALS
(ASSEMBLY)

AAR
SIG. SEC.

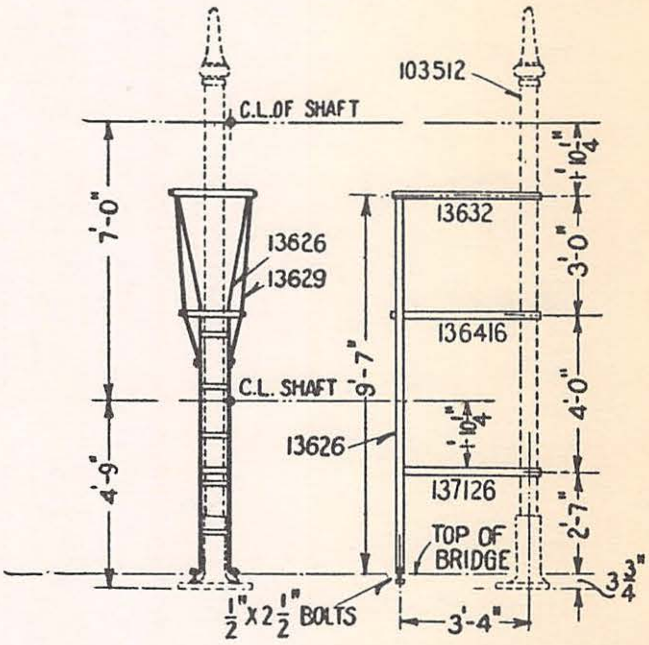
					M-1941	SEP. 1941	M-1936	MAR 1936	MAR. 1918	JUN. 1917	MAR. 1917

1365C

See 1362, 1363, 1364, 1366 and 1371.


13644
13632
½"X1¼" BOLTS
13626 OR 13628
13629
½"X1" BOLTS

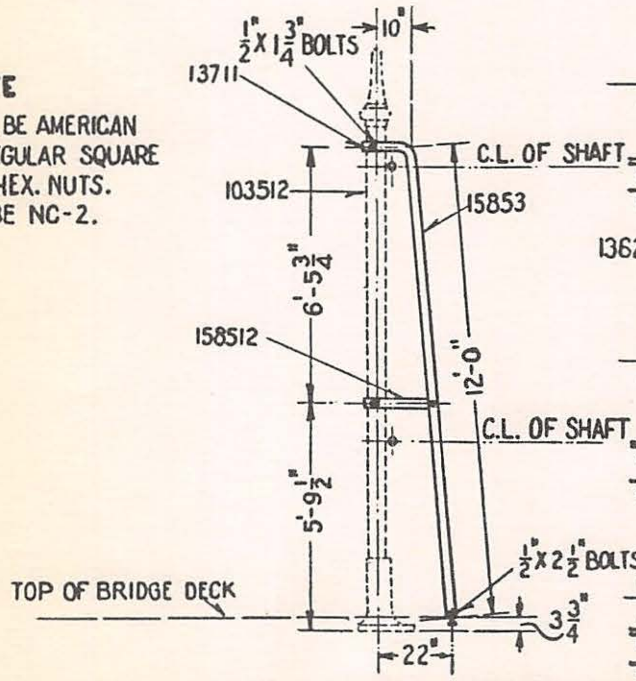
ENLARGED ASSEMBLY


103512
C.L.OF SHAFT
7'-0"
13626
13629
13632
1'-10¼"
3'-0"
9'-7"
136416
C.L. SHAFT
4'-0"
13626
1'-10¼"
4'-9"
137126
2'-7"
TOP OF BRIDGE
3¾"
½"X2½" BOLTS
3'-4"

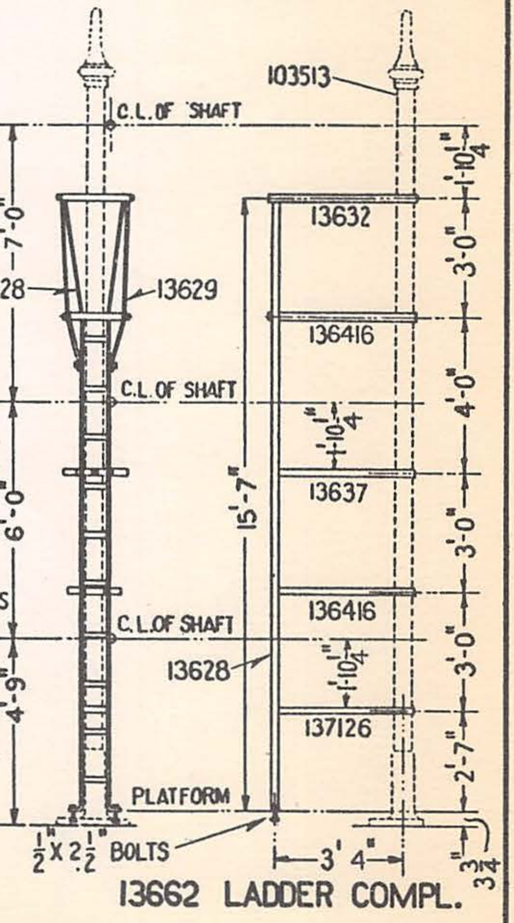
13661 LADDER COMPLETE

NOTE

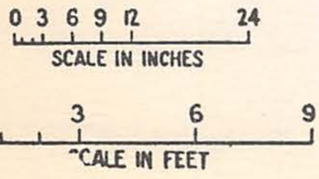
BOLTS SHALL BE AMERICAN
STANDARD REGULAR SQUARE
HEAD WITH HEX. NUTS.
THREAD TO BE NC-2.


½"X1¾" BOLTS
10"
13711
C.L. OF SHAFT
103512
15853
6'-5¾"
158512
12'-0"
C.L. OF SHAFT
5'-9½"
½"X2½" BOLTS
TOP OF BRIDGE DECK
3¾"
22"

13663 LADDER COMPLETE


103513
C.L. OF SHAFT
1'-10¼"
7'-0"
13632
13628
13629
3'-0"
136416
C.L. OF SHAFT
4'-0"
1'-10¼"
13637
15'-7"
6'-0"
3'-0"
136416
C.L. OF SHAFT
3'-0"
13628
1'-10¼"
137126
4'-9"
2'-7"
PLATFORM
½"X2½" BOLTS
3' 4"
3¾"

13662 LADDER COMPL.

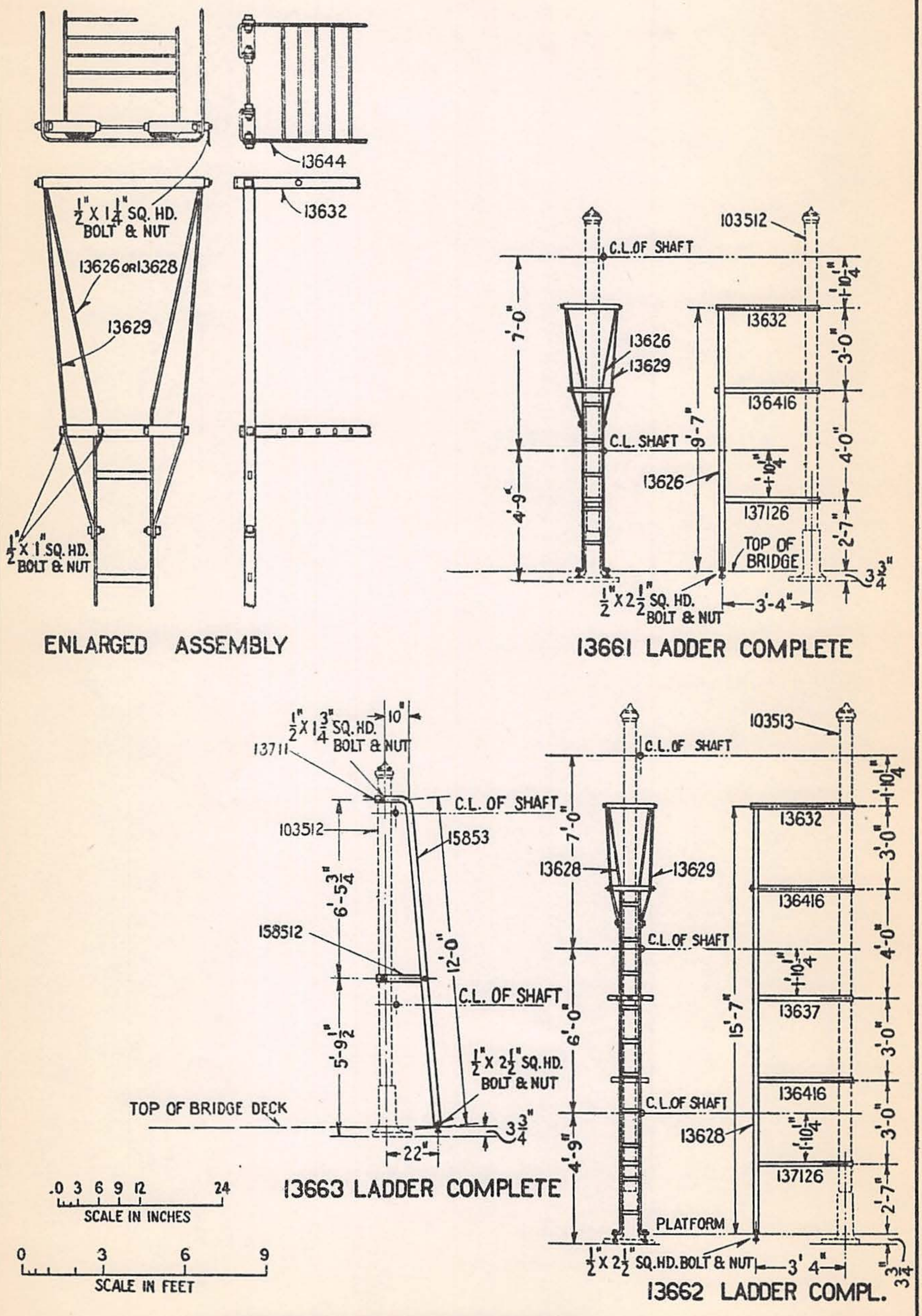

0 3 6 9 12 24
SCALE IN INCHES
0 3 6 9
SCALE IN FEET

LADDERS FOR BRIDGE MASTS

AAR
SIG. SEC.
1366B

M-1935 | MAR 1935 | MAR 1918

See 1362, 1363, 1364, 1365 and 1371.


13644
13632
$\frac{1}{2}$" X $1\frac{1}{4}$" SQ. HD. BOLT & NUT
13626 OR 13628
13629
$\frac{1}{2}$" X 1" SQ. HD. BOLT & NUT
103512
C.L. OF SHAFT
7'-0"
1'-10$\frac{1}{4}$"
13632
3'-0"
13626
13629
9'-7"
136416
C.L. SHAFT
4'-0"
1'-10$\frac{1}{4}$"
13626
4'-9"
137126
2'-7"
TOP OF BRIDGE
3$\frac{3}{4}$"
$\frac{1}{2}$"X$2\frac{1}{2}$" SQ. HD. BOLT & NUT
3'-4"
$\frac{1}{2}$"X$1\frac{3}{4}$" SQ. HD. BOLT & NUT
10"
13711
C.L. OF SHAFT
103512
15853
6'-5$\frac{3}{4}$"
158512
12'-0"
C.L. OF SHAFT
5'-9$\frac{1}{2}$"
$\frac{1}{2}$"X $2\frac{1}{2}$" SQ. HD. BOLT & NUT
TOP OF BRIDGE DECK
3$\frac{3}{4}$"
22"
103513
C.L. OF SHAFT
1'-10$\frac{1}{4}$"
7'-0"
13632
3'-0"
13628
13629
136416
C.L. OF SHAFT
4'-0"
1'-10$\frac{1}{4}$"
15'-7"
13637
6'-0"
3'-0"
136416
C.L. OF SHAFT
3'-0"
13628
1'-10$\frac{1}{4}$"
4'-9"
137126
2'-7"
PLATFORM
$\frac{1}{2}$"X $2\frac{1}{2}$" SQ. HD. BOLT & NUT
3' 4"
3$\frac{3}{4}$"
.0 3 6 9 12 24
SCALE IN INCHES
0 3 6 9
SCALE IN FEET

ENLARGED ASSEMBLY

13661 LADDER COMPLETE

13663 LADDER COMPLETE

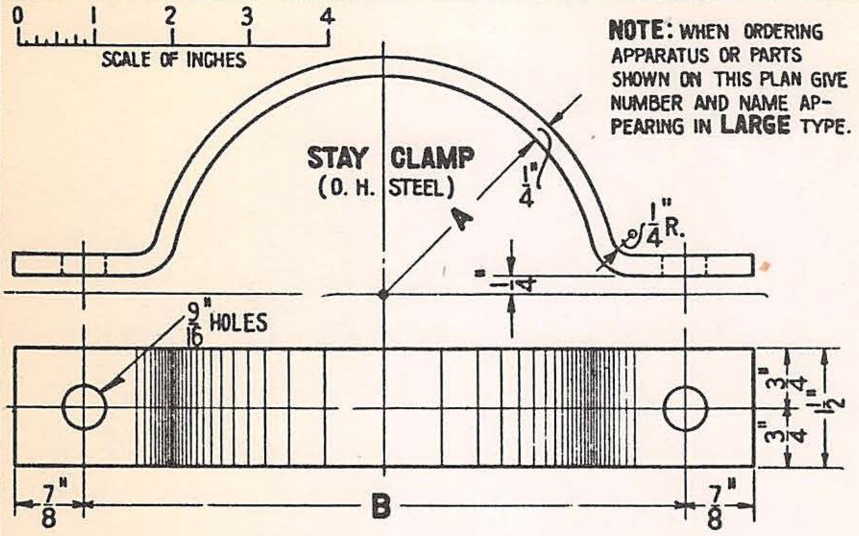
13662 LADDER COMPL.

LADDERS FOR BRIDGE MASTS

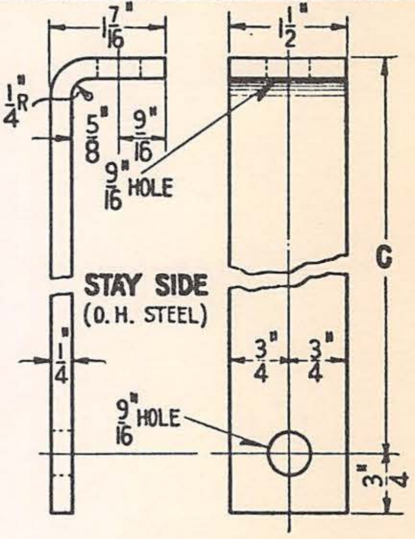
							M-1941	SEP. 1941	M-1935	MAR 1935	MAR 1918

AAR
SIG. SEC.
1366 C

See 1362, 1363, 1364, 1365 and 1371.

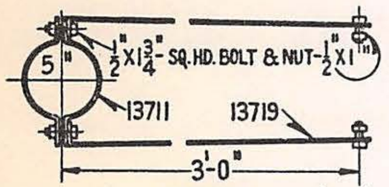

0 1 2 3 4
SCALE OF INCHES
STAY CLAMP
(O. H. STEEL)
1/4"
A
1/4"R.
1/4"
9/16" HOLES
3/4"
3/4"
1 1/2"
7/8"
B
7/8"

NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

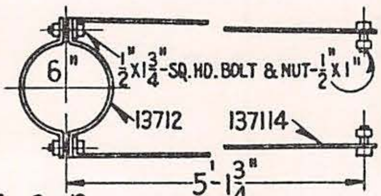

1 7/16"
1 1/2"
1/4"R
5/8"
9/16"
9/16" HOLE
C
STAY SIDE
(O. H. STEEL)
1/4
9/16" HOLE
3/4"
3/4"
3/4"

REF. NO.	NAME	PIPE (SIZE)	A	B
13711	STAY CLAMP	5"	2 3/4"	7 3/4"
13712	" "	6"	3 5/16"	8 7/8"
13713	" "	6" (SWAGE)	3 1/16"	8 3/8"

REF. NO	NAME	C
13719	STAY SIDE	2'-11 5/8"
137110	" "	3'-3 5/8"
137111	" "	3'-6 1/8"
137112	" "	4'-0 1/8"
137113	" "	4'-7 1/8"
137114	" "	5-1 3/8

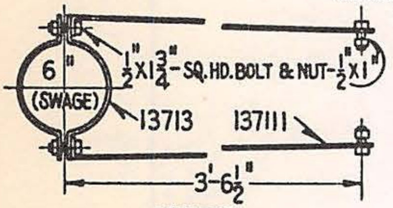

5"
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13711
13719
3'-0"

137115

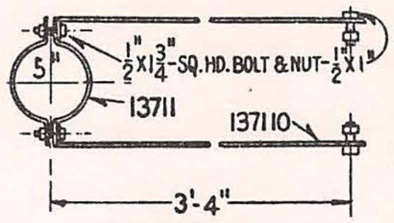

6"
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13712
137114
5'-1 3/4"

137119

0 3 6 9 12
SCALE OF INCHES

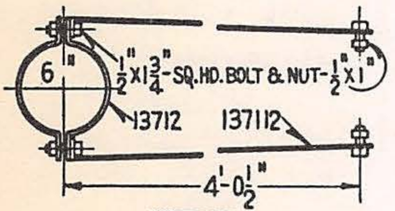

6"
(SWAGE)
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13713
137111
3'-6 1/2"

137116

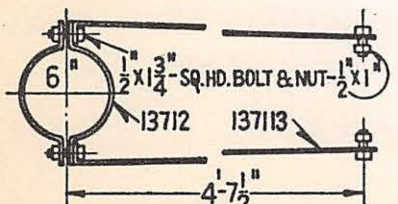

5"
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13711
137110
3'-4"

137126
LADDER STAYS COMPL.

ALL BOLTS ARE AMERICAN STD.
REGULAR WITH NC-2 THREAD.


6"
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13712
137112
4'-0 1/2"

137117


6"
1/2"X1 3/4"-SQ.HD.BOLT & NUT-1/2"X1"
13712
137113
4'-7 1/2"

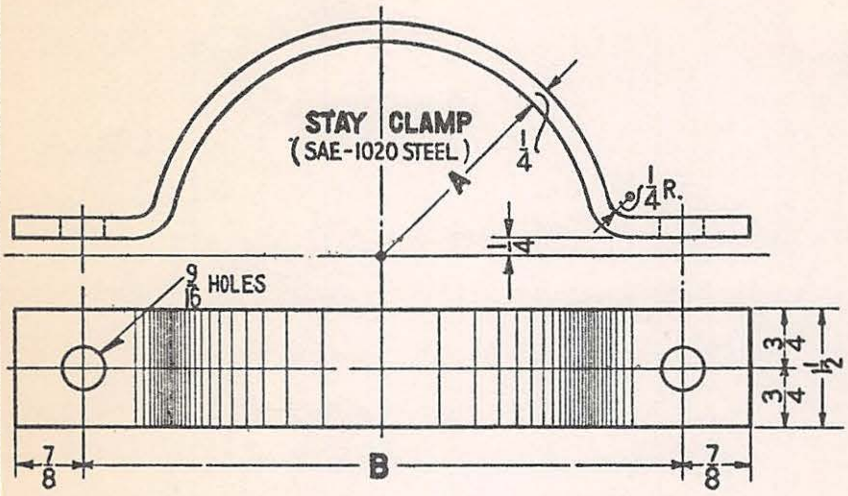
137118

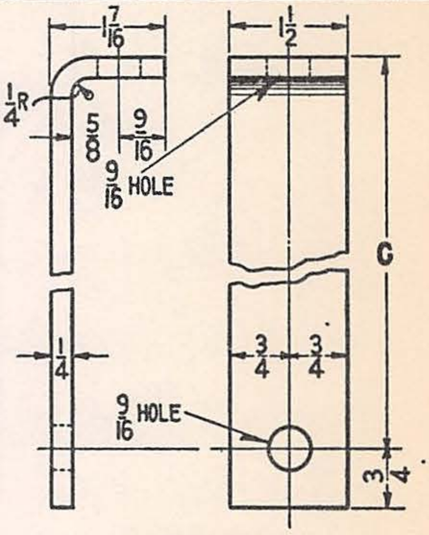
LADDER CLAMPS AND STAYS
(DETAILS AND ASSEMBLY)

M-1935 | MAR.1935 | DEC.1918 | MAR.1918

AAR
SIG.SEC.
1371B

See 1362, 1363, 1365 and 1366.

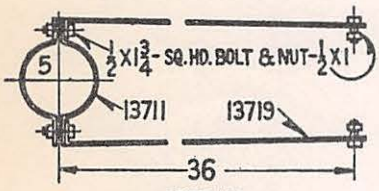

STAY CLAMP
(SAE-1020 STEEL)
A
1/4
1/4 R.
1/4
9/16 HOLES
3/4
3/4
1 1/2
7/8
B
7/8


1 7/16
1 1/2
1/4 R
5/8
9/16
9/16 HOLE
C
1/4
3/4
3/4
9/16 HOLE
3/4

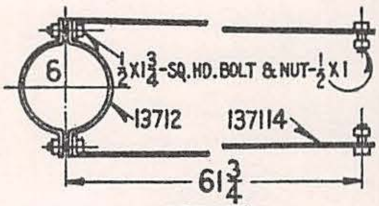
STAY SIDE
(SAE-1020 STEEL)

REF. NO.	NAME	PIPE (SIZE)	A	B
13711	STAY CLAMP	5	$2\frac{3}{4}$	$7\frac{3}{4}$
13712	" "	6	$3\frac{5}{16}$	$8\frac{7}{8}$
13713	" "	6 (SWAGE)	$3\frac{1}{16}$	$8\frac{3}{8}$

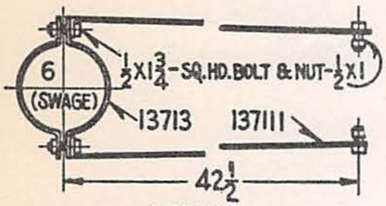
REF. NO	NAME	C
13719	STAY SIDE	$35\frac{5}{8}$
137110	" "	$39\frac{5}{8}$
137111	" "	$42\frac{1}{8}$
137112	" "	$48\frac{1}{8}$
137113	" "	$55\frac{1}{8}$
137114	" "	$61\frac{3}{8}$
137130	" "	$11\frac{5}{8}$


5
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13711
13719
36

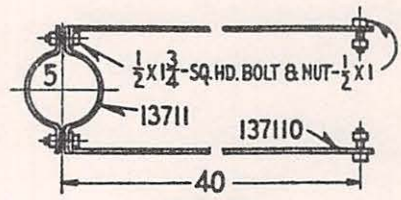
137115


6
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13712
137114
61 3/4

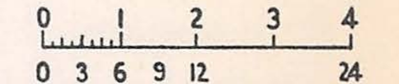
137119


6
(SWAGE)
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13713
137111
42 1/2

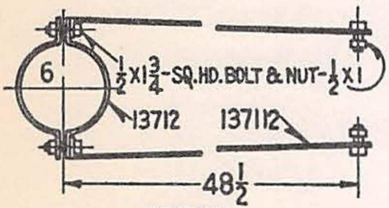
137116


5
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13711
137110
40

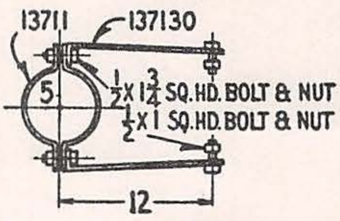
137126


0
1
2
3
4
0
3
6
9
12
24

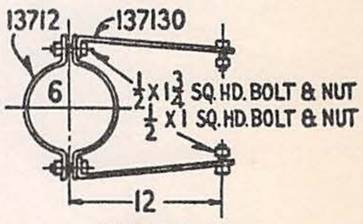
SCALES AND ALL DIMENSIONS GIVEN IN INCHES


6
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13712
137112
48 1/2

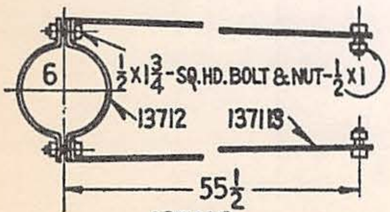
137117


13711
137130
5
1/2 X 1 3/4 SQ. HD. BOLT & NUT
1/2 X 1 SQ. HD. BOLT & NUT
12

137127

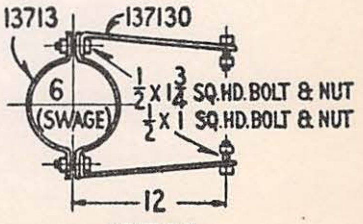

13712
137130
6
1/2 X 1 3/4 SQ. HD. BOLT & NUT
1/2 X 1 SQ. HD. BOLT & NUT
12

137128


6
1/2 X 1 3/4 - SQ. HD. BOLT & NUT - 1/2 X 1
13712
137113
55 1/2

137118

LADDER STAYS COMPL.


13713
137130
6
(SWAGE)
1/2 X 1 3/4 SQ. HD. BOLT & NUT
1/2 X 1 SQ. HD. BOLT & NUT
12

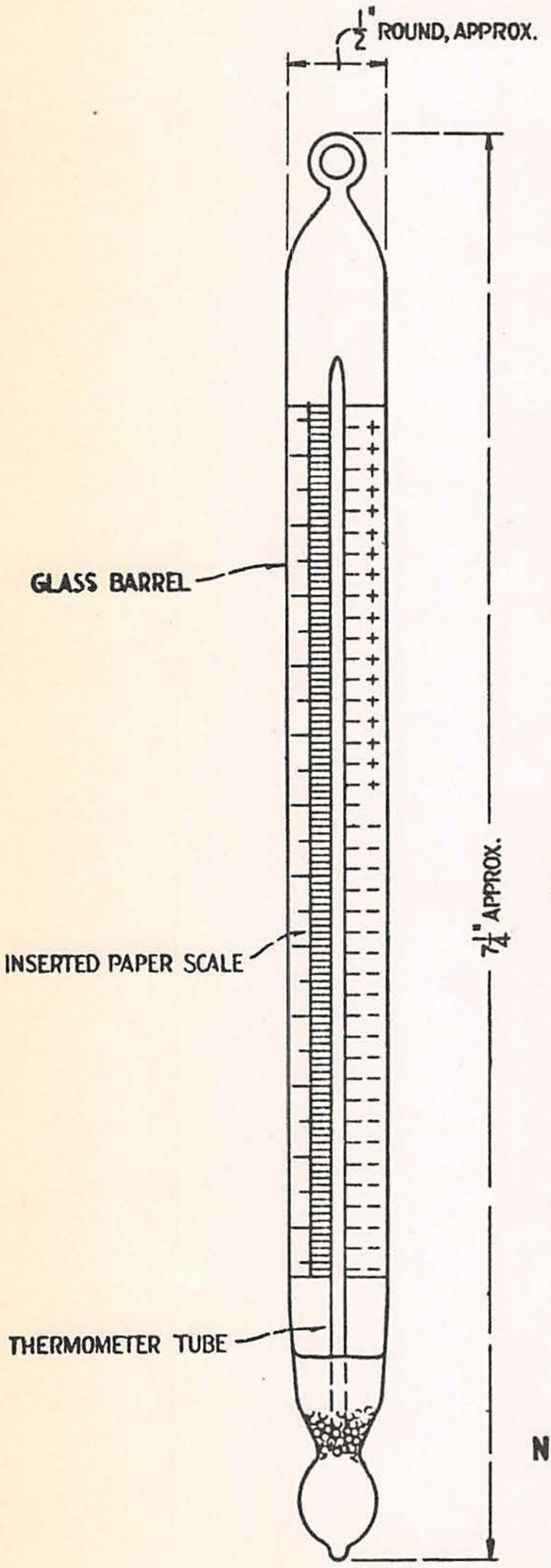
137129

LADDER CLAMPS AND STAYS
(DETAILS AND ASSEMBLY)

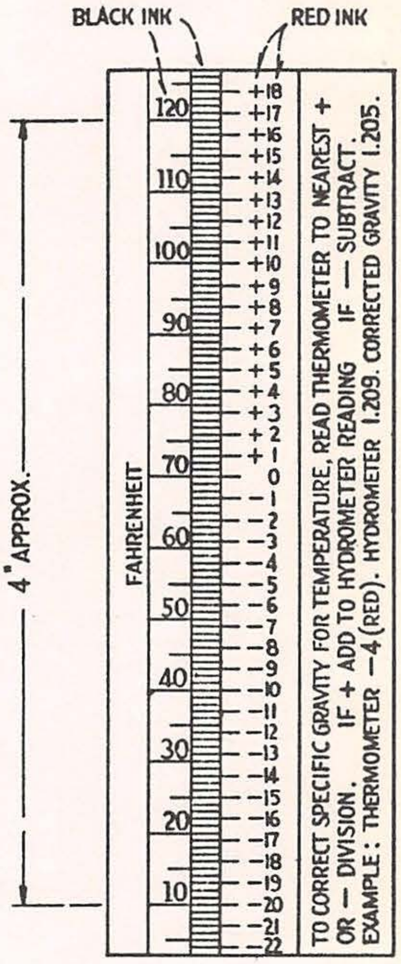
						M-1941	SEP. 1941	M-1935	MAR. 1935	DEC. 1918	MAR. 1918

AAR
SIG. SEC.
1371C

See 1362, 1363, 1365 and 1366.


1/2" ROUND, APPROX.
7 1/4" APPROX.
GLASS BARREL
INSERTED PAPER SCALE
THERMOMETER TUBE

13752-THERMOMETER


BLACK INK
RED INK
4" APPROX.
FAHRENHEIT
120
110
100
90
80
70
60
50
40
30
20
10
+18
+17
+16
+15
+14
+13
+12
+11
+10
+9
+8
+7
+6
+5
+4
+3
+2
+1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-14
-15
-16
-17
-18
-19
-20
-21
-22
TO CORRECT SPECIFIC GRAVITY FOR TEMPERATURE, READ THERMOMETER TO NEAREST + OR — DIVISION. IF + ADD TO HYDROMETER READING IF — SUBTRACT.
EXAMPLE: THERMOMETER —4 (RED). HYDROMETER 1.209. CORRECTED GRAVITY 1.205.

DETAIL OF SCALE

NOTE:

THERMOMETER SHALL BE ACCURATE WITHIN THREE (3) DEGREES.

SCALE SHALL BE FIRMLY FIXED IN PLACE SO THAT IT CANNOT CHANGE POSITION IN RELATION TO THERMOMETER TUBE

THERMOMETER SHALL BE WEIGHTED SO THAT IT WILL JUST FLOAT IN AN UPRIGHT POSITION IMMERSED TO AT LEAST TOP OF SCALE IN WATER AT 70° F.

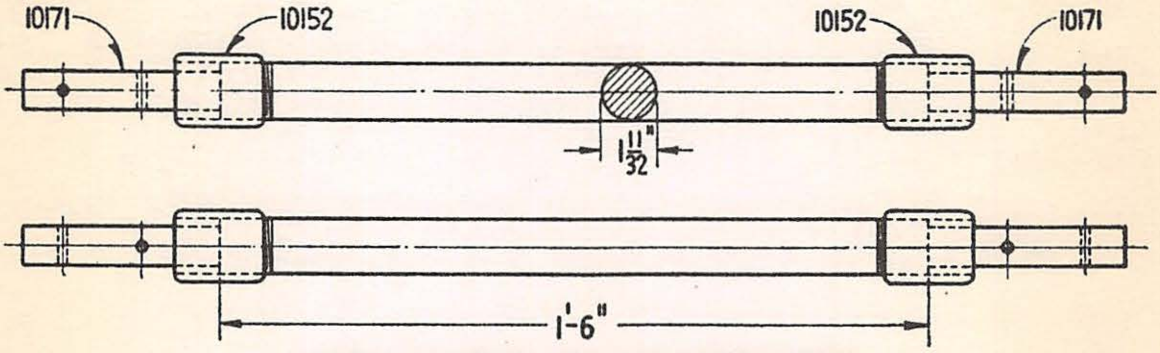
THERMOMETER SHALL BE FURNISHED IN TUBULAR CONTAINER WITH TELESCOPE COVER.

THE LIQUID USED IN THERMOMETER SHALL BE MERCURY.

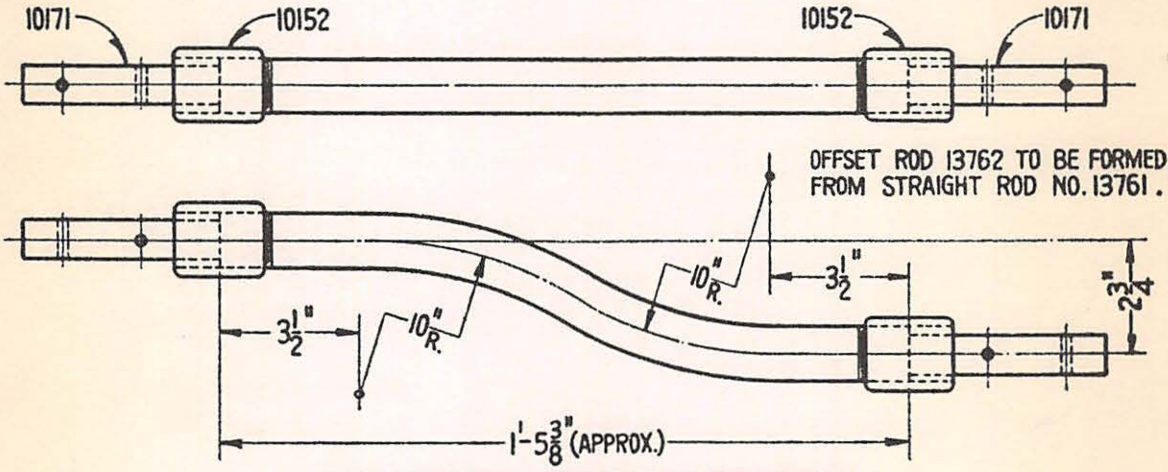
THERMOMETER
LEAD TYPE STORAGE BATTERY

M-1935 | MAR.1935 | NOV.1917 | OCT.1917

AAR
SIG.SEC.
1375B


10171
10152
10152
10171
1 11/32"
1'-6"

13761 STRAIGHT ROD WITH TANG ENDS
(O. H. STEEL)


10171
10152
10152
10171
10" R.
3 1/2"
3 1/2"
10" R.
2 3/4"
1'-5 3/8" (APPROX.)

OFFSET ROD 13762 TO BE FORMED FROM STRAIGHT ROD NO. 13761.

13762 OFFSET ROD WITH TANG ENDS
(O. H. STEEL)

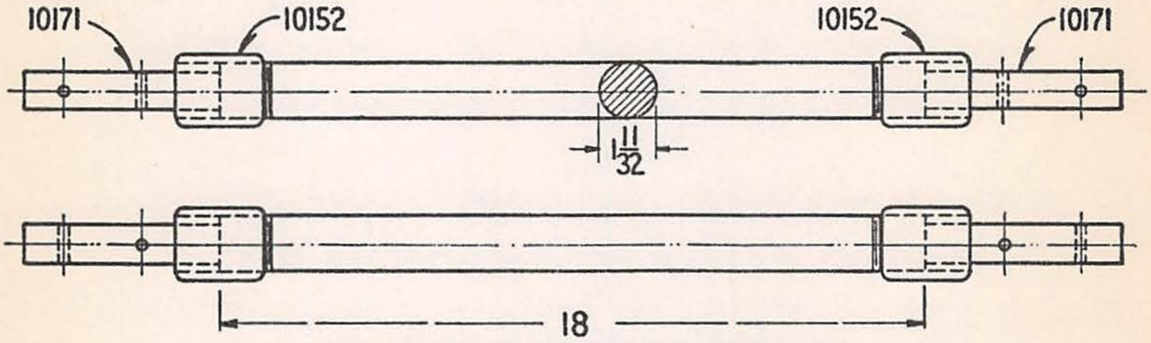
NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN **LARGE** TYPE.

0 1 2 3 6 9 12
SCALE OF INCHES

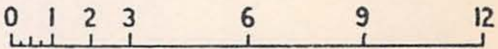
DOUBLE TANG ENDS
(DETAILS AND ASSEMBLY)

MAR 1918

RSA 1376


10171
10152
10152
10171
$1\frac{11}{32}$
18

13761 STRAIGHT ROD WITH TANG ENDS
SAE-1020 STEEL

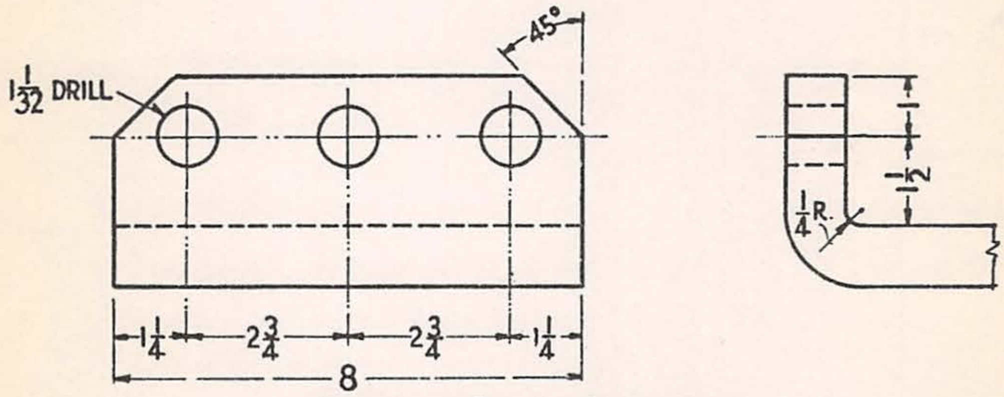


SCALE & ALL DIMENSIONS GIVEN IN INCHES

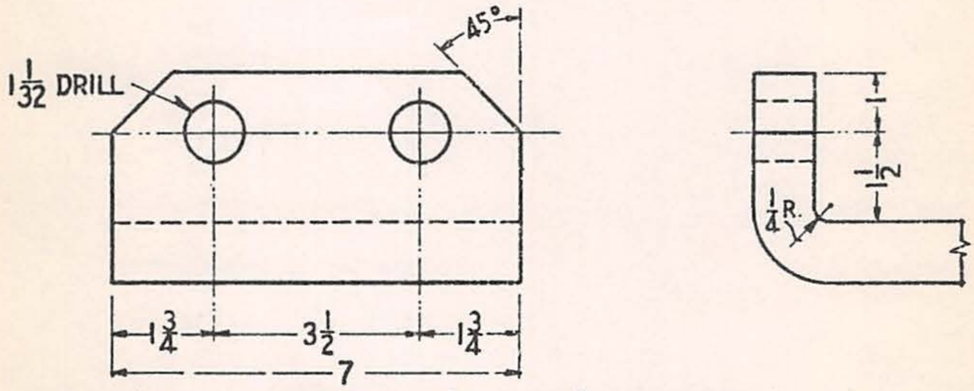
DOUBLE TANG END

AAR
SIG. SEC.
1376B

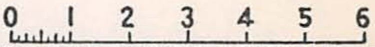
M-1942 | OCT. 1942 | MAR.1918


1 1/32 DRILL
45°
1 1/4
2 3/4
2 3/4
1 1/4
8
1
1/2
1/4 R.

13831 FOR 3/4, 1 OR 1 1/8 INCH PLATE


1 1/32 DRILL
45°
1 3/4
3 1/2
1 3/4
7
1
1/2
1/4 R.

13832 FOR 3/4, 1 OR 1 1/8 INCH PLATE



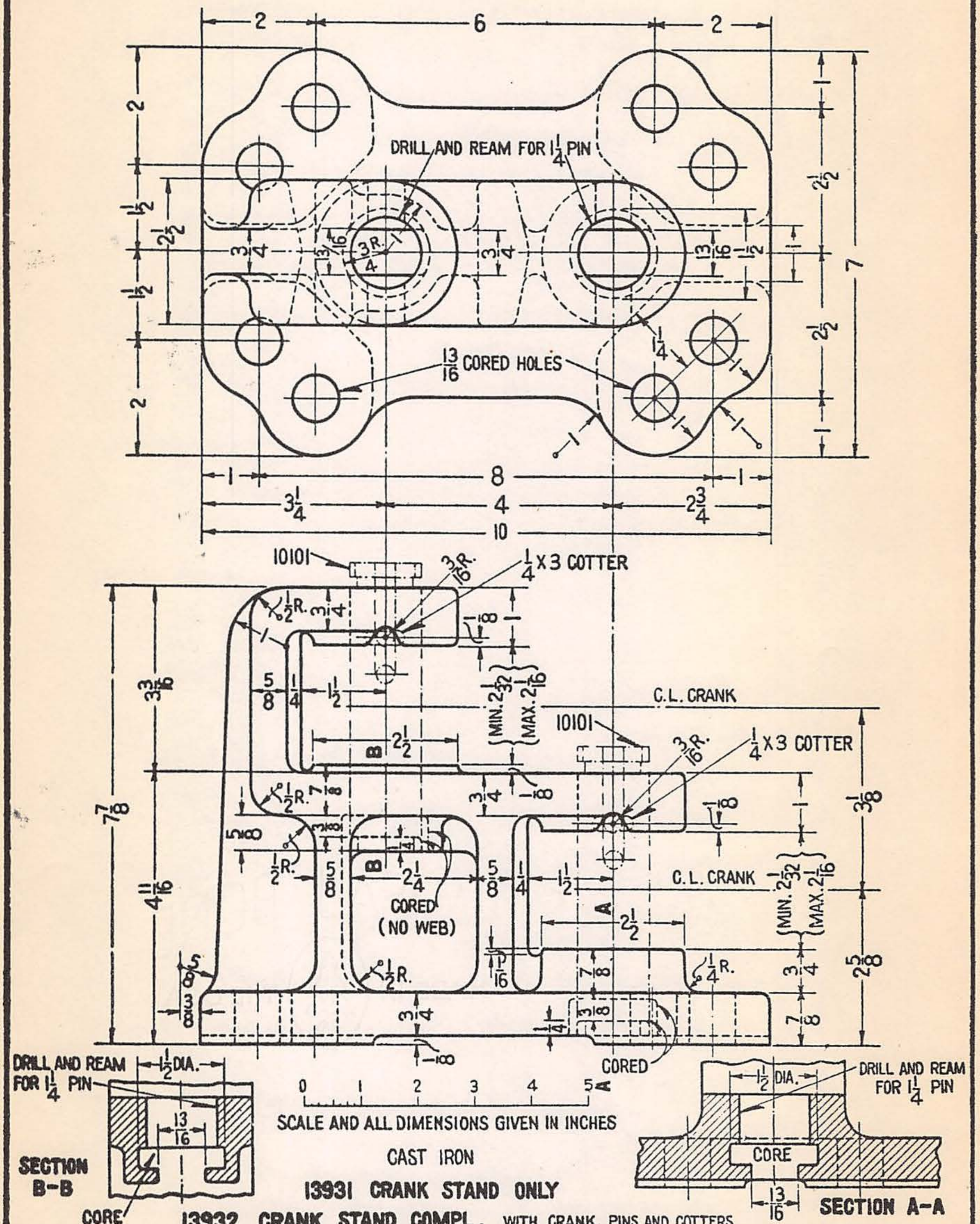
SCALE & ALL DIMENSIONS GIVEN IN INCHES

BUTT END PLATES

INSULATED GAGE PLATES

AAR
SIG.SEC.
1383A

M-1942 | OCT.1942



DRILL AND REAM FOR 1¼ PIN
13/16 CORED HOLES
2
6
2
2
1½
2½
3/4
1½
2
3/16
3/4 R.
1
3/4
13/16
1½
1
2½
7
2½
1¼
1
1
8
1
3¼
4
2¾
10
10101
3/16 R.
¼ X 3 COTTER
½ R.
3/4
1/8
1
3 3/16
5/8
¼
1½
B
2½
MIN. 2 1/32
MAX. 2 1/16
C.L. CRANK
10101
3/16 R.
¼ X 3 COTTER
7 7/8
½ R.
7/8
3/4
1/8
1/8
1
3 1/8
5/8
3/16
½ R.
5/8
B
2¼
5/8
¼
1½
C.L. CRANK
4 11/16
CORED
(NO WEB)
A
2½
MIN. 2 1/32
MAX. 2 1/16
1/16
7/8
¼ R.
3/4
2 5/8
5
½ R.
3/8
3/4
3/8
7/8
¼
1/8
CORED
A
DRILL AND REAM FOR 1¼ PIN
1½ DIA.
13/16
SECTION B-B
CORE
0
1
2
3
4
5
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
CAST IRON
1½ DIA.
DRILL AND REAM FOR 1¼ PIN
CORE
13/16
SECTION A-A

13931 CRANK STAND ONLY

13932	**CRANK**	**STAND**	**COMPL.**	WITH CRANK, PINS AND COTTERS
13933	"	"	"	WITH 9 X 9 CRANKS 10075
13934	"	"	"	WITH $11\frac{3}{4}$ X $11\frac{3}{4}$ CRANKS 10076
13935	"	"	"	WITH $14\frac{1}{2}$ X $14\frac{1}{2}$ CRANKS 10077

TWO-WAY SEPARATE PIN HORIZONTAL CRANK STAND

DETAILS AND ASSEMBLY

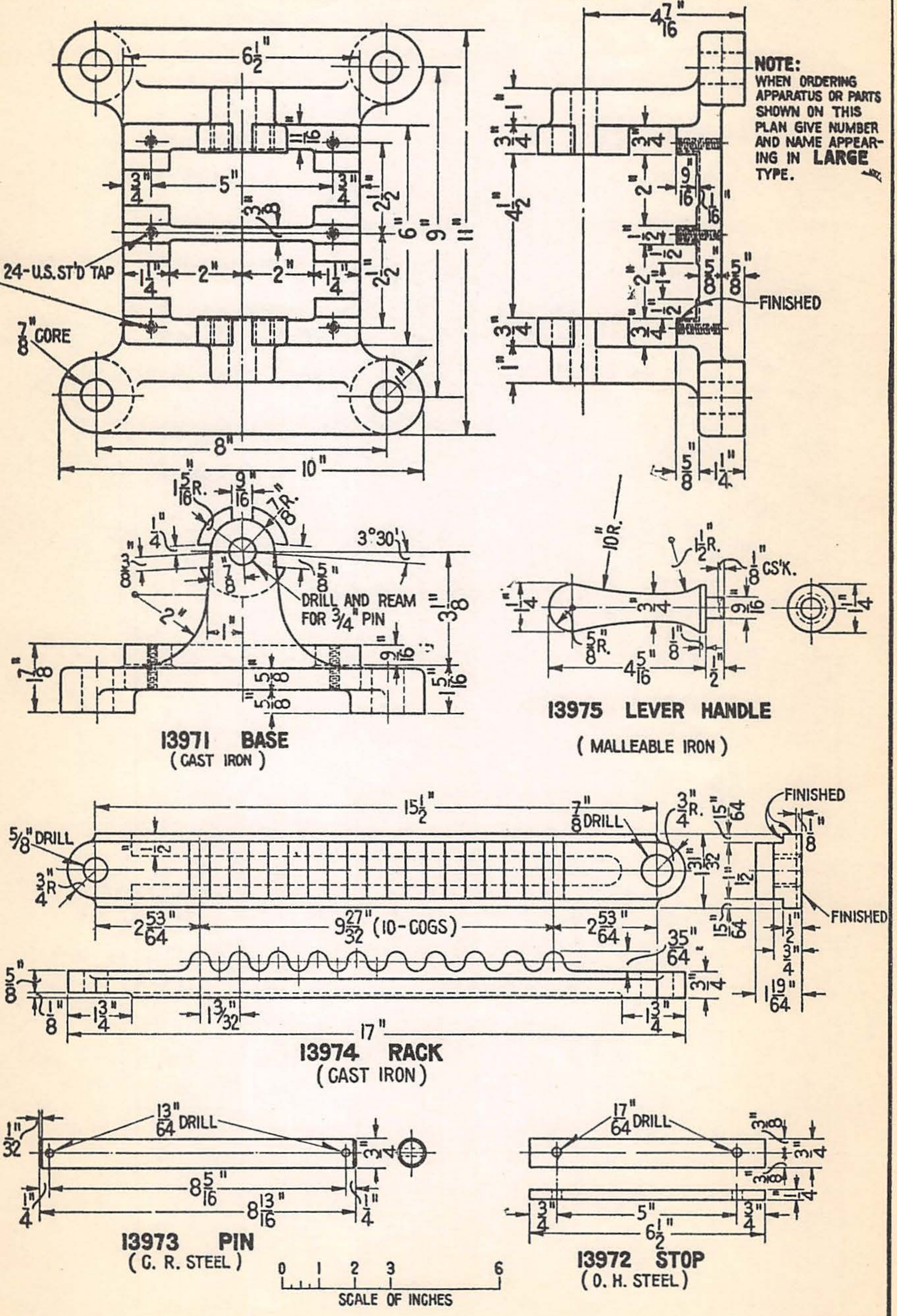
						M-1946	OCT. 1946	M-1927	MAR. 1927	SEPT. 1926	SEPT. 1916

AAR
SIG. SEC.
1393C

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

PRINTED IN U. S. A.

SPECIFICATION UNIT
FEB 12 1948



NOTE: WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN LARGE TYPE.
1/4" X 24-U.S. ST'D TAP
7/8" CORE
FINISHED
DRILL AND REAM FOR 3/4" PIN
13971 BASE
(CAST IRON)
10" R.
1/8" CS'K.
13975 LEVER HANDLE
(MALLEABLE IRON)
5/8" DRILL
7/8" DRILL
9 27/32" (10-COGS)
FINISHED
13974 RACK
(CAST IRON)
13/64" DRILL
13973 PIN
(C. R. STEEL)
17/64" DRILL
13972 STOP
(O. H. STEEL)
0 1 2 3 6
SCALE OF INCHES

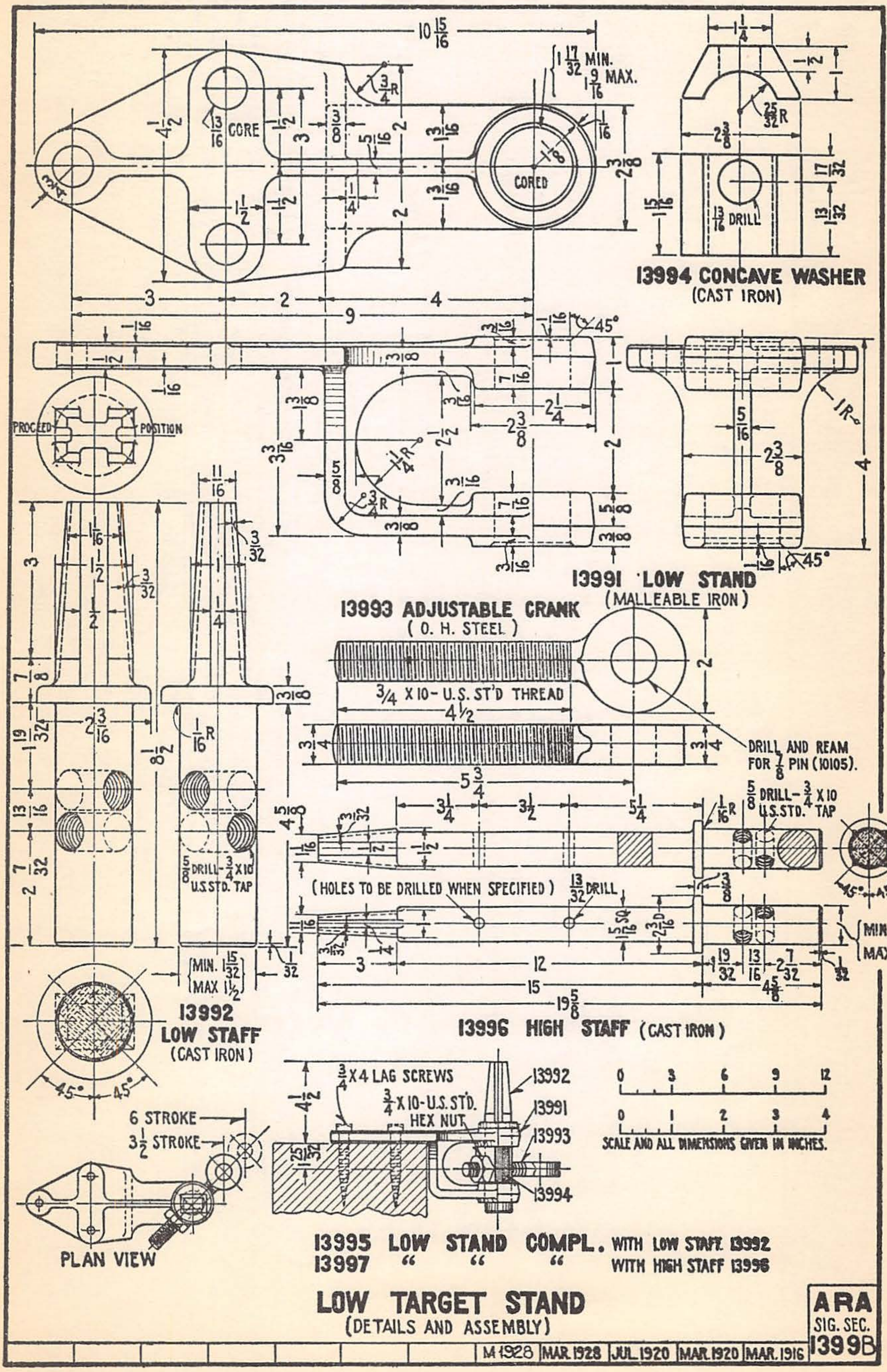
TWO-LEVER WALL MACHINE

(DETAILS)

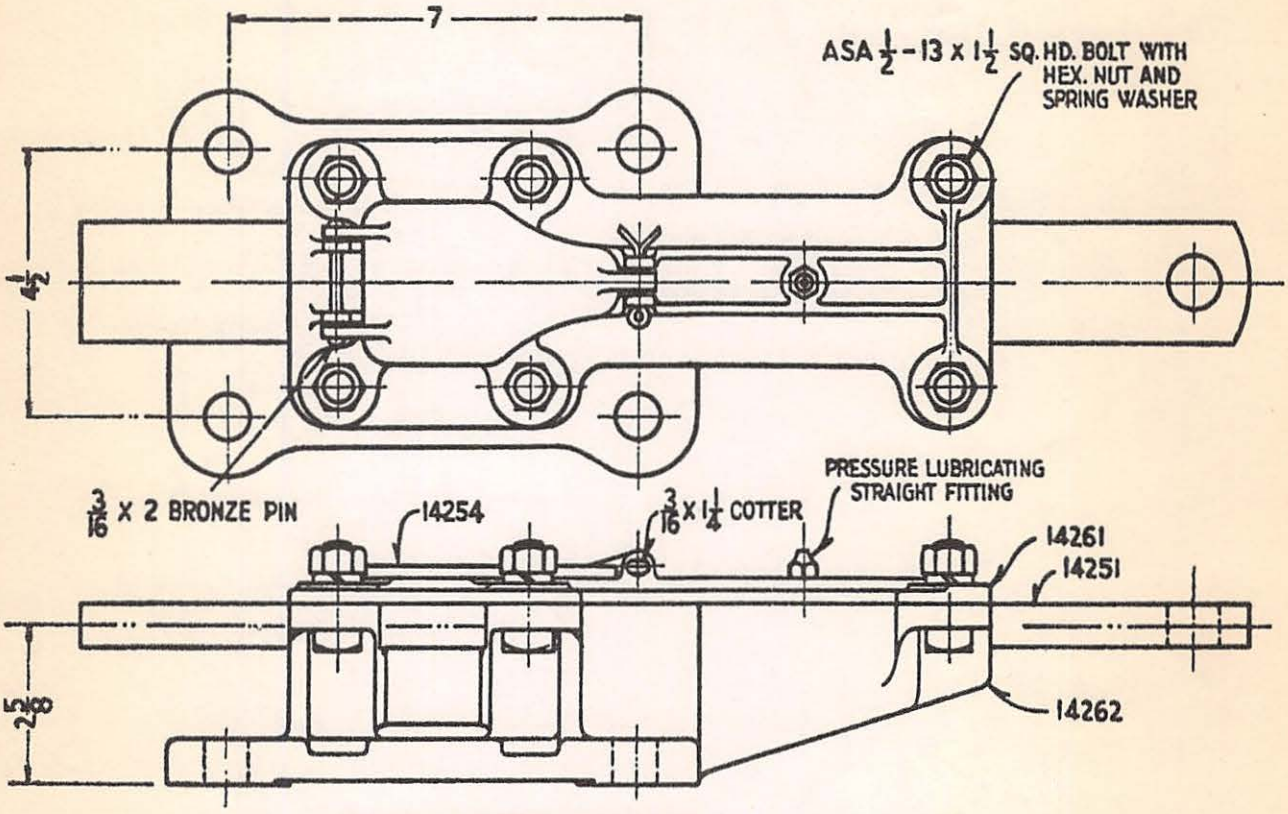
DEC. 1915 SEP. 1915

RSA 1397

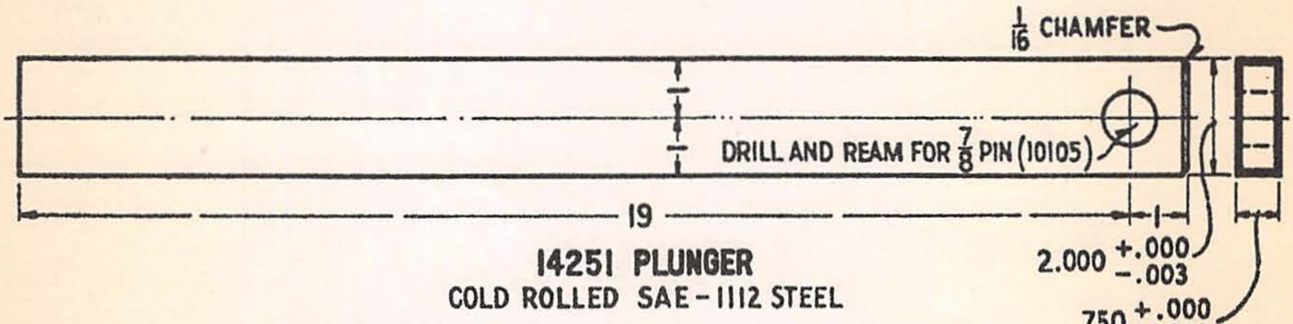
See 1197.
Cast iron shall be in accordance with Specification for Gray Iron Castings.
Malleable iron shall be in accordance with Specification for Malleable Iron Castings.


13994 CONCAVE WASHER
(CAST IRON)
13991 LOW STAND
(MALLEABLE IRON)
13993 ADJUSTABLE CRANK
(O. H. STEEL)
3/4 X 10 - U.S. ST'D THREAD
DRILL AND REAM FOR 7/8 PIN (10105).
5/8 DRILL - 3/4 X 10 U.S. STD. TAP
(HOLES TO BE DRILLED WHEN SPECIFIED) 13/32 DRILL
MIN. 1 15/32 D.
MAX. 1 1/2 D.
13992
LOW STAFF
(CAST IRON)
13996 HIGH STAFF (CAST IRON)
CORE
CORED
PROCEED
POSITION
3/4 X 4 LAG SCREWS
3/4 X 10 - U.S. STD. HEX NUT
13992
13991
13993
13994
6 STROKE
3 1/2 STROKE
PLAN VIEW
SCALE AND ALL DIMENSIONS GIVEN IN INCHES.
13995 LOW STAND COMPL. WITH LOW STAFF 13992
13997 " " " WITH HIGH STAFF 13996
LOW TARGET STAND
(DETAILS AND ASSEMBLY)
ARA
SIG. SEC.
1399B
M 1928
MAR. 1928
JUL. 1920
MAR. 1920
MAR. 1916

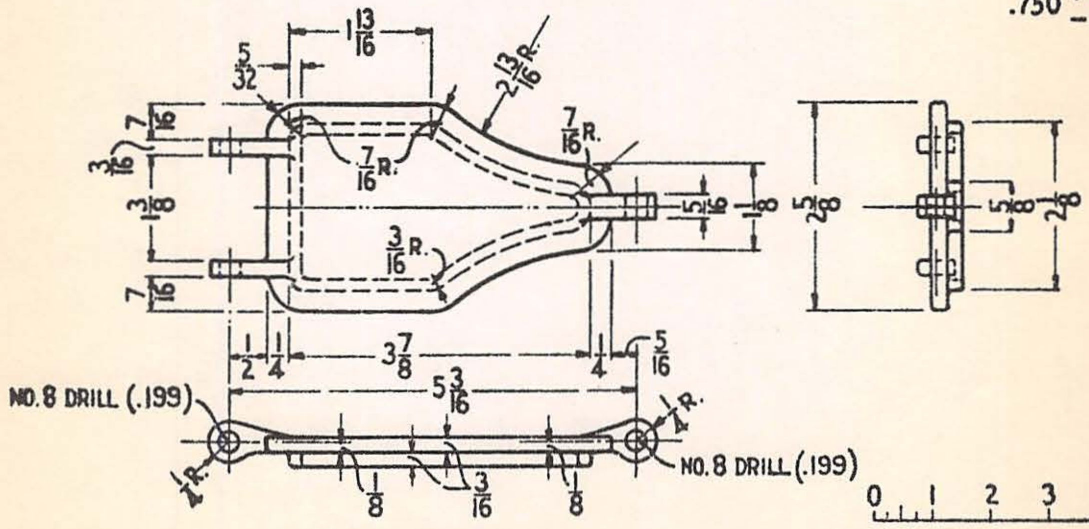
Cast iron shall be in accordance with Specification for Gray Iron Castings. Malleable iron shall be in accordance with Specification for Malleable Iron Castings.


7
ASA 1/2 - 13 x 1 1/2 SQ. HD. BOLT WITH HEX. NUT AND SPRING WASHER
4 1/2
3/16 x 2 BRONZE PIN
14254
3/16 x 1 1/4 COTTER
PRESSURE LUBRICATING STRAIGHT FITTING
14261
14251
2 5/8
14262

14252 PLUNGER STAND ONLY
14253 " " COMPL.— WITH PLUNGER.


1/16 CHAMFER
1
DRILL AND REAM FOR 7/8 PIN (10105)
19
1
2.000 +.000 −.003
.750 +.000 −.003

14251 PLUNGER
COLD ROLLED SAE-1112 STEEL


1 13/16
5/32
2 13/16 R.
7/16
3/16
7/16 R.
7/16 R.
1 3/8
3/16 R.
5/16
1 1/8
2 5/8
5/8
2 1/8
7/16
1/2
1/4
3 7/8
1/4
5/16
5 3/16
NO. 8 DRILL (.199)
1/4 R.
1/4 R.
NO. 8 DRILL (.199)
1/8
3/16
1/8

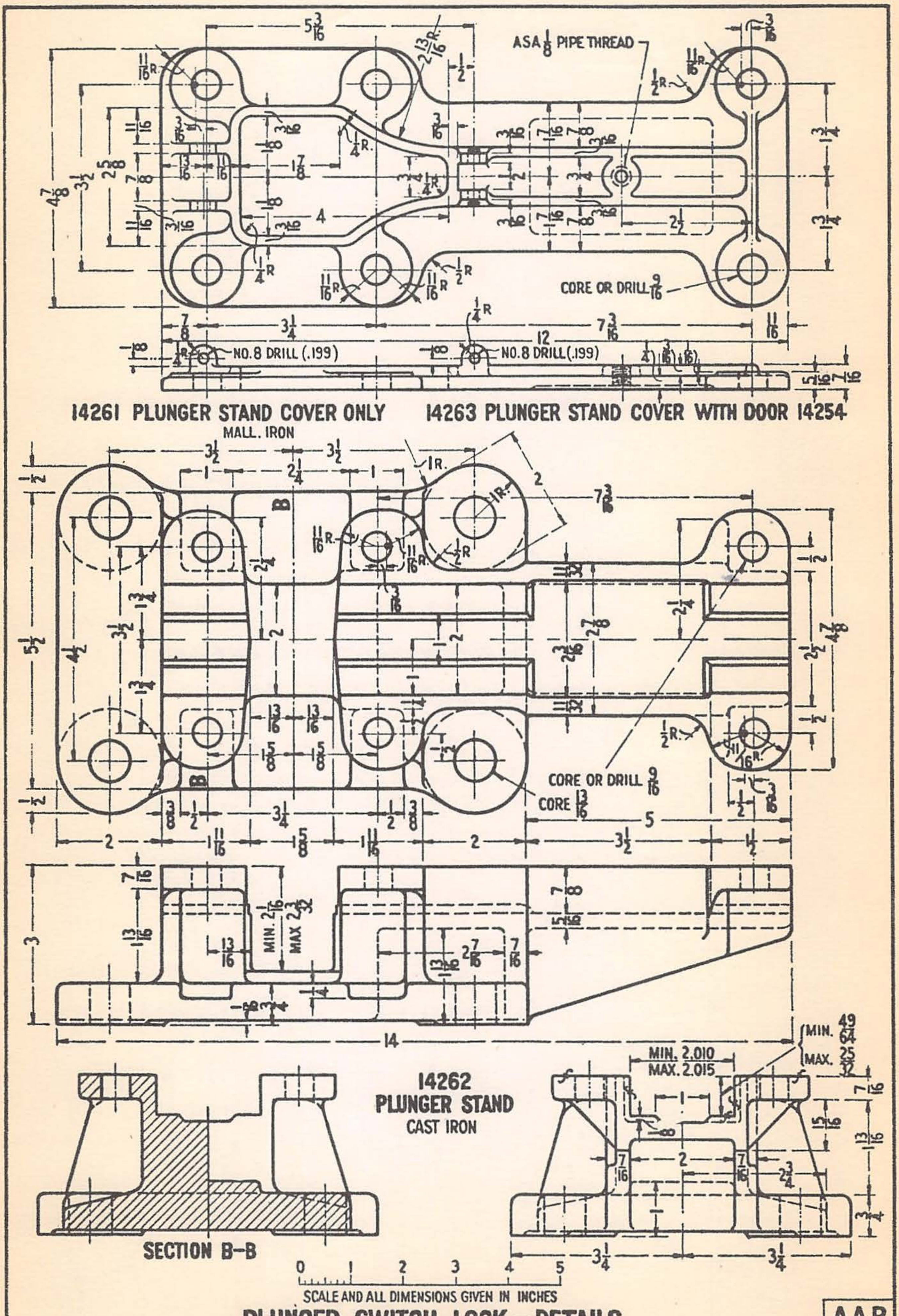
14254 DOOR
MALLEABLE IRON

0 1 2 3 4
0 1 2 3 4
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

PLUNGER SWITCH LOCK
RECTANGULAR PLUNGER

M-1940 | OCT. 1940 | M-1936 | MAR. 1936 | M-1926 | SEP. 1924 | JUN. 1921

AAR
SIG. SEC.
1425D


14261 PLUNGER STAND COVER ONLY
14263 PLUNGER STAND COVER WITH DOOR 14254
MALL. IRON
ASA 1/8 PIPE THREAD
NO. 8 DRILL (.199)
CORE OR DRILL 9/16
CORE 13/16
MIN. 2.010
MAX. 2.015
MIN. 49/64
MAX. 25/32
MIN. 2 1/16
MAX 2 3/32
14262
PLUNGER STAND
CAST IRON
SECTION B-B
0 1 2 3 4 5

SCALE AND ALL DIMENSIONS GIVEN IN INCHES

PLUNGER SWITCH LOCK—DETAILS

RECTANGULAR PLUNGER

M-1940	OCT. 1940	MAN.-1936	MAR. 1936	MAN.-1926	SEP. 1924	JUN. 1921

AAR
SIG. SEC.
1426D

Cast iron shall be in accordance with Specification for Gray Iron Castings. Malleable iron shall be in accordance with Specification for Malleable Iron Castings.

AMERICAN STANDARD
B 32.1 — 1941

THICKNESS IN INCHES

	0.180	0.090	0.045	0.022	0.011	
	0.160	0.080	0.040	0.020	0.010	0.005
	0.140	0.071	0.036	0.018	0.009	
	0.125	0.063	0.032	0.016	0.008	0.004
0.224	0.112	0.056	0.028	0.014	0.007	
0.200	0.100	0.050	0.025	0.012	0.006	

NOTE: IF INTERMEDIATE THICKNESSES ARE REQUIRED, SELECTIONS SHALL BE MADE FOR ALL METALS AND ALLOYS BY THE USE OF THICKNESSES BASED ON THE 40-SERIES OF AMERICAN STANDARD PREFERRED NUMBERS (Z17.1 —1936).
SEE DRAWING 1427B FOR COMPARISON WITH PREVIOUS GAGE NUMBER SYSTEMS.

PREFERRED THICKNESSES FOR UNCOATED THIN FLAT METALS

UNDER 0.250 INCH

AAR
SIG.SEC.
1437A

M-1942 OCT. 1942

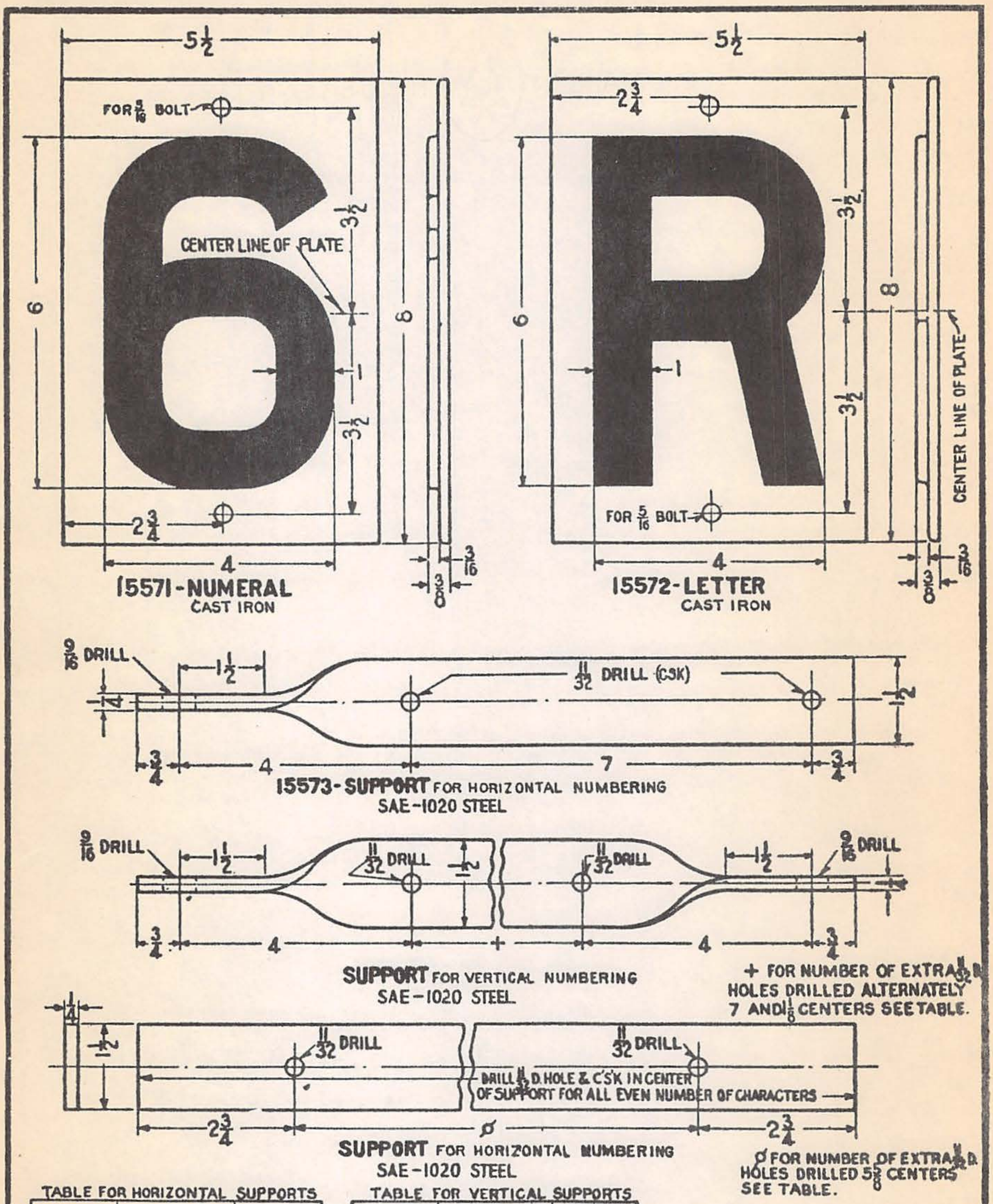

5 1/2
FOR 5/16 BOLT
CENTER LINE OF PLATE
3 1/2
1
6
8
2 3/4
4
3/16
3/8
15571-NUMERAL
CAST IRON
15572-LETTER
CAST IRON
9/16 DRILL
1 1/2
11/32 DRILL (CSK)
7
3/4
15573-SUPPORT FOR HORIZONTAL NUMBERING
SAE-1020 STEEL
11/32 DRILL
SUPPORT FOR VERTICAL NUMBERING
SAE-1020 STEEL
+ FOR NUMBER OF EXTRA 11/32 D. HOLES DRILLED ALTERNATELY 7 AND 1 1/8 CENTERS SEE TABLE.
DRILL 11/32 D. HOLE & CSK IN CENTER OF SUPPORT FOR ALL EVEN NUMBER OF CHARACTERS
Ø
SUPPORT FOR HORIZONTAL NUMBERING
SAE-1020 STEEL
Ø FOR NUMBER OF EXTRA 11/32 D. HOLES DRILLED 5 5/8 CENTERS SEE TABLE.

TABLE FOR HORIZONTAL SUPPORTS

ORDER NUMBER	NUMBER OF CHARACTERS	Ø
15574	2	Ø = 5 5/8
15575	3	1
15576	4	2
15577	5	3

TABLE FOR VERTICAL SUPPORTS

ORDER NUMBER	NUMBER OF CHARACTERS	+
15578	2	2
15579	3	4
155710	4	6
155711	5	8

NOTE: ALL NUMERALS AND LETTERS SHALL BE PAINTED WHITE ON BLACK BACKGROUND.

0 1 2 4 6

SCALE AND ALL DIMENSIONS GIVEN IN INCHES

NUMERALS AND LETTERS

DETAILS

AAR
SIG. SEC.
1557B

M-1946 OCT.1946 MAN-1926 SEP.1924

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

Paint and painting shall be in accordance with Specification 120, Manual Part 110.

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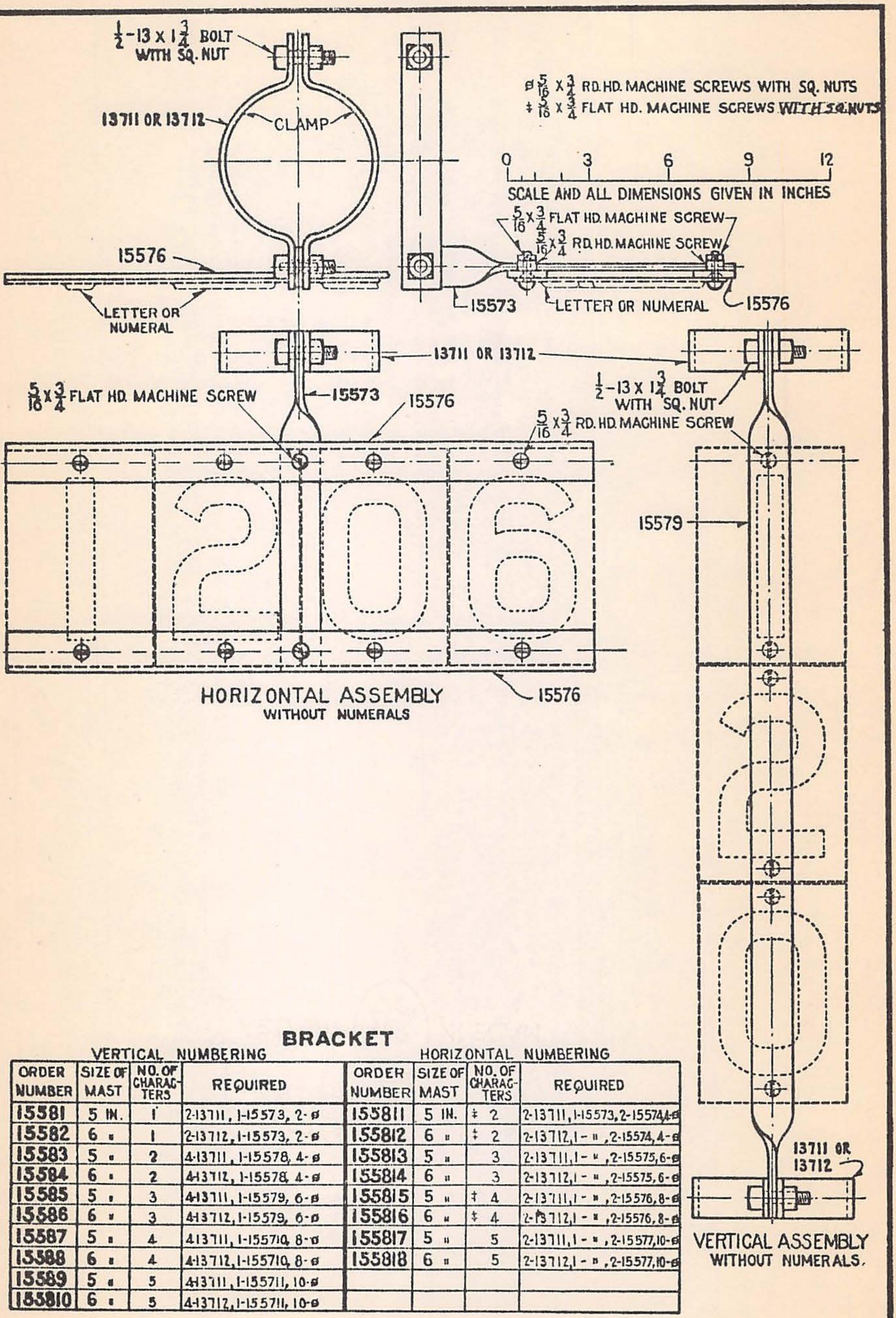
SPECIFICATION DEPT.
FEB 12 1948


$\frac{1}{2}$-13 X 1$\frac{3}{4}$ BOLT WITH SQ. NUT
13711 OR 13712
CLAMP
ø $\frac{5}{16}$ X $\frac{3}{4}$ RD. HD. MACHINE SCREWS WITH SQ. NUTS
‡ $\frac{5}{16}$ X $\frac{3}{4}$ FLAT HD. MACHINE SCREWS ~~WITH SQ. NUTS~~
0 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
$\frac{5}{16}$ X $\frac{3}{4}$ FLAT HD. MACHINE SCREW
$\frac{5}{16}$ X $\frac{3}{4}$ RD. HD. MACHINE SCREW
15576
LETTER OR NUMERAL
15573
LETTER OR NUMERAL
15576
13711 OR 13712
$\frac{5}{16}$ X $\frac{3}{4}$ FLAT HD. MACHINE SCREW
15573
15576
$\frac{1}{2}$-13 X 1$\frac{3}{4}$ BOLT WITH SQ. NUT
$\frac{5}{16}$ X $\frac{3}{4}$ RD. HD. MACHINE SCREW
15579
1206
HORIZONTAL ASSEMBLY
WITHOUT NUMERALS
15576
13711 OR 13712
VERTICAL ASSEMBLY
WITHOUT NUMERALS.

BRACKET

VERTICAL NUMBERING

ORDER NUMBER	SIZE OF MAST	NO. OF CHARACTERS	REQUIRED
15581	5 IN.	1	2-13711, 1-15573, 2-ø
15582	6 "	1	2-13712, 1-15573, 2-ø
15583	5 "	2	4-13711, 1-15578, 4-ø
15584	6 "	2	4-13712, 1-15578, 4-ø
15585	5 "	3	4-13711, 1-15579, 6-ø
15586	6 "	3	4-13712, 1-15579, 6-ø
15587	5 "	4	4-13711, 1-155710, 8-ø
15588	6 "	4	4-13712, 1-155710, 8-ø
15589	5 "	5	4-13711, 1-155711, 10-ø
155810	6 "	5	4-13712, 1-155711, 10-ø

HORIZONTAL NUMBERING

ORDER NUMBER	SIZE OF MAST	NO. OF CHARACTERS	REQUIRED
155811	5 IN.	‡ 2	2-13711, 1-15573, 2-15574, 4-ø
155812	6 "	‡ 2	2-13712, 1- " , 2-15574, 4-ø
155813	5 "	3	2-13711, 1- " , 2-15575, 6-ø
155814	6 "	3	2-13712, 1- " , 2-15575, 6-ø
155815	5 "	‡ 4	2-13711, 1- " , 2-15576, 8-ø
155816	6 "	‡ 4	2-13712, 1- " , 2-15576, 8-ø
155817	5 "	5	2-13711, 1- " , 2-15577, 10-ø
155818	6 "	5	2-13712, 1- " , 2-15577, 10-ø

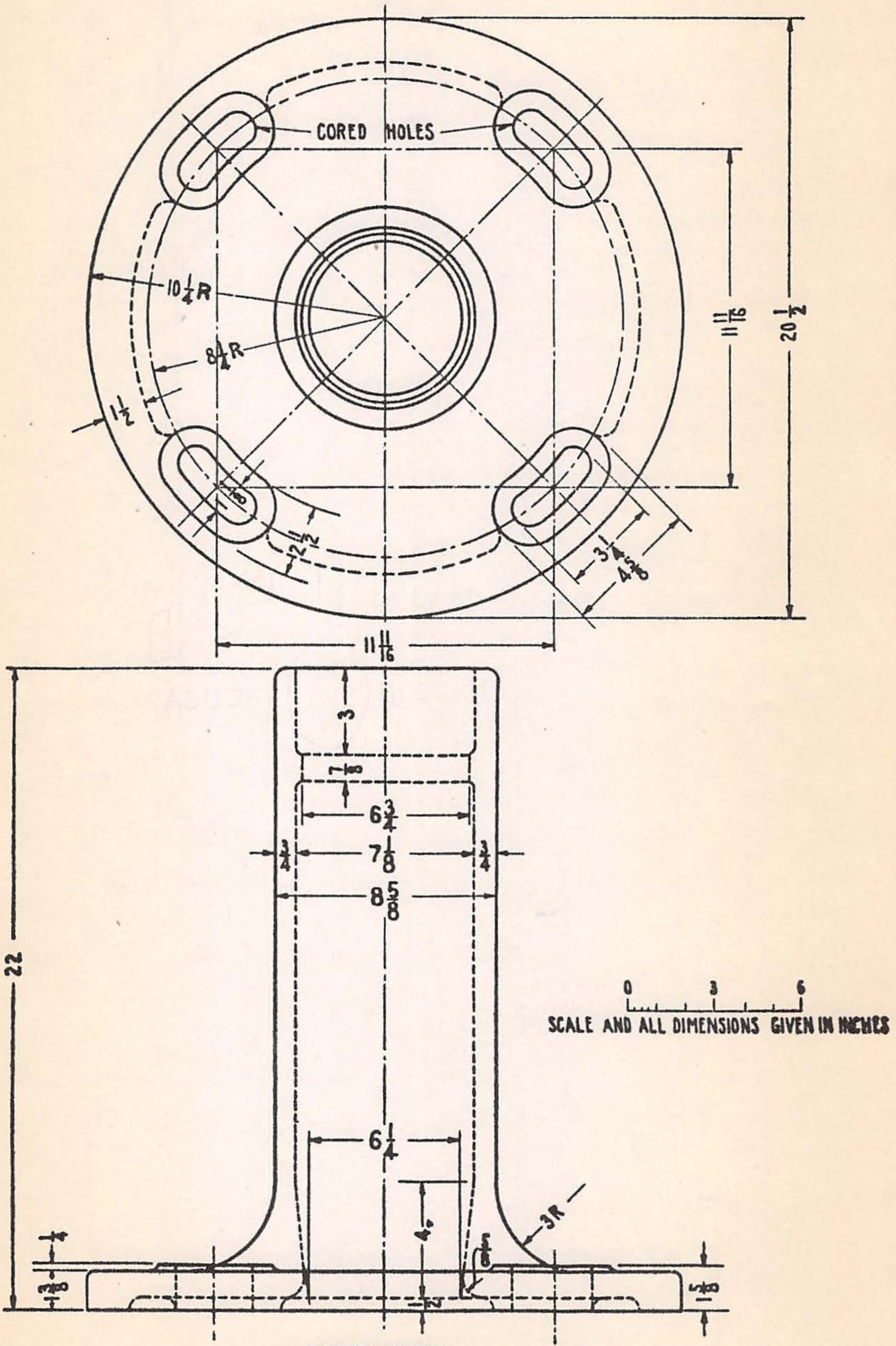
BRACKETS FOR NUMERALS AND LETTERS

ASSEMBLIES

AAR
SIG. SEC.
1558B

M-1946 | OCT. 1946 | MAN. 1926 | SEP. 1924

Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.



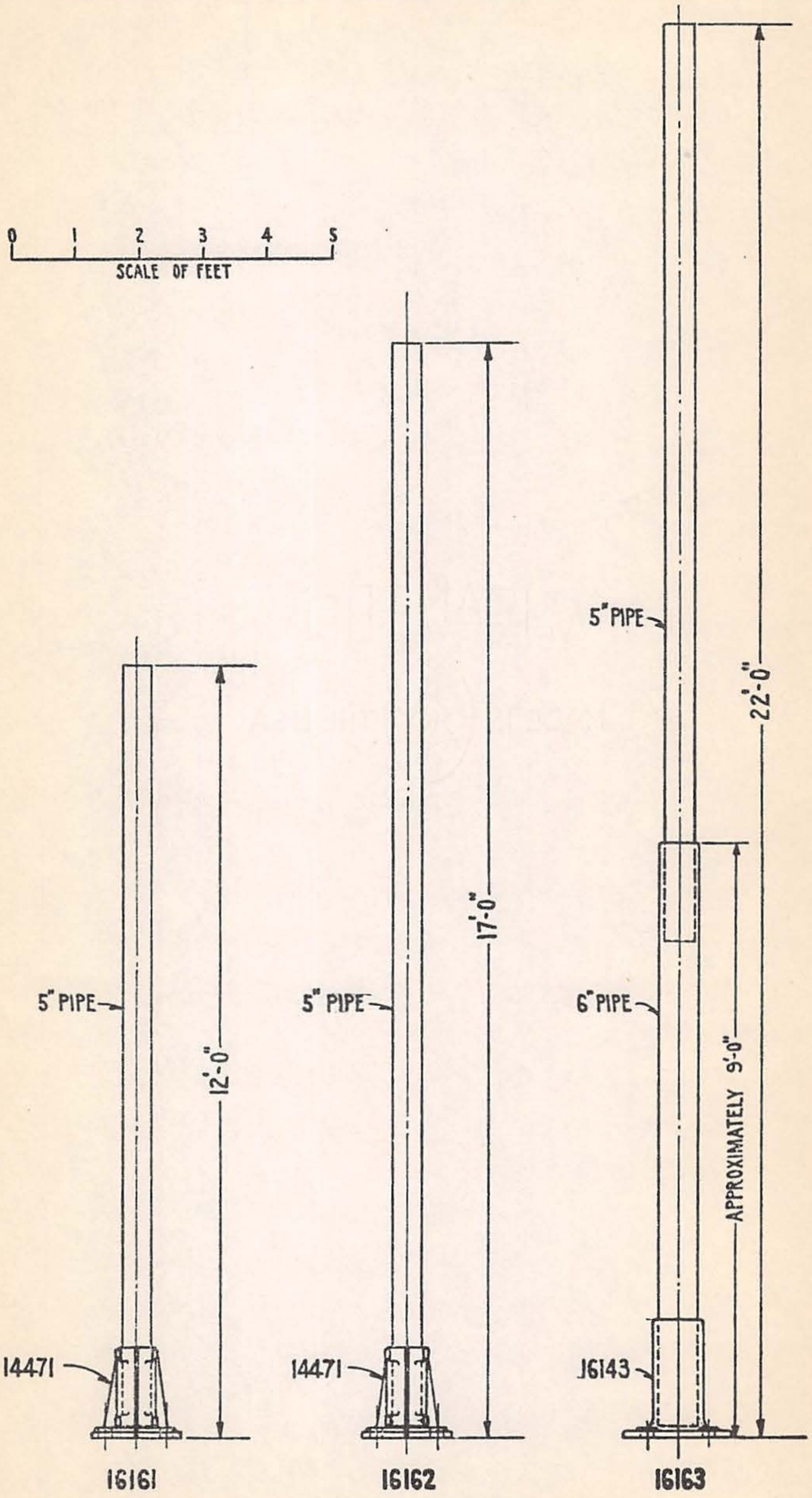
CORED HOLES
10 1/4 R
8 1/4 R
1 1/2
11 11/16
20 1/2
3 1/4
4 5/8
1 1/2
2
11 11/16
3
6 3/4
3/4
7 1/8
3/4
8 5/8
22
6 1/4
4
3R
1/4
1 3/8
5/8
1/2
0
3
6
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

16143 BASE
CAST IRON

BASE FOR 6-INCH GROUND MAST

M-1946	OCT. 1946	M-1928	SEP. 1927	AAR SIG. SEC. 1614B

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88.

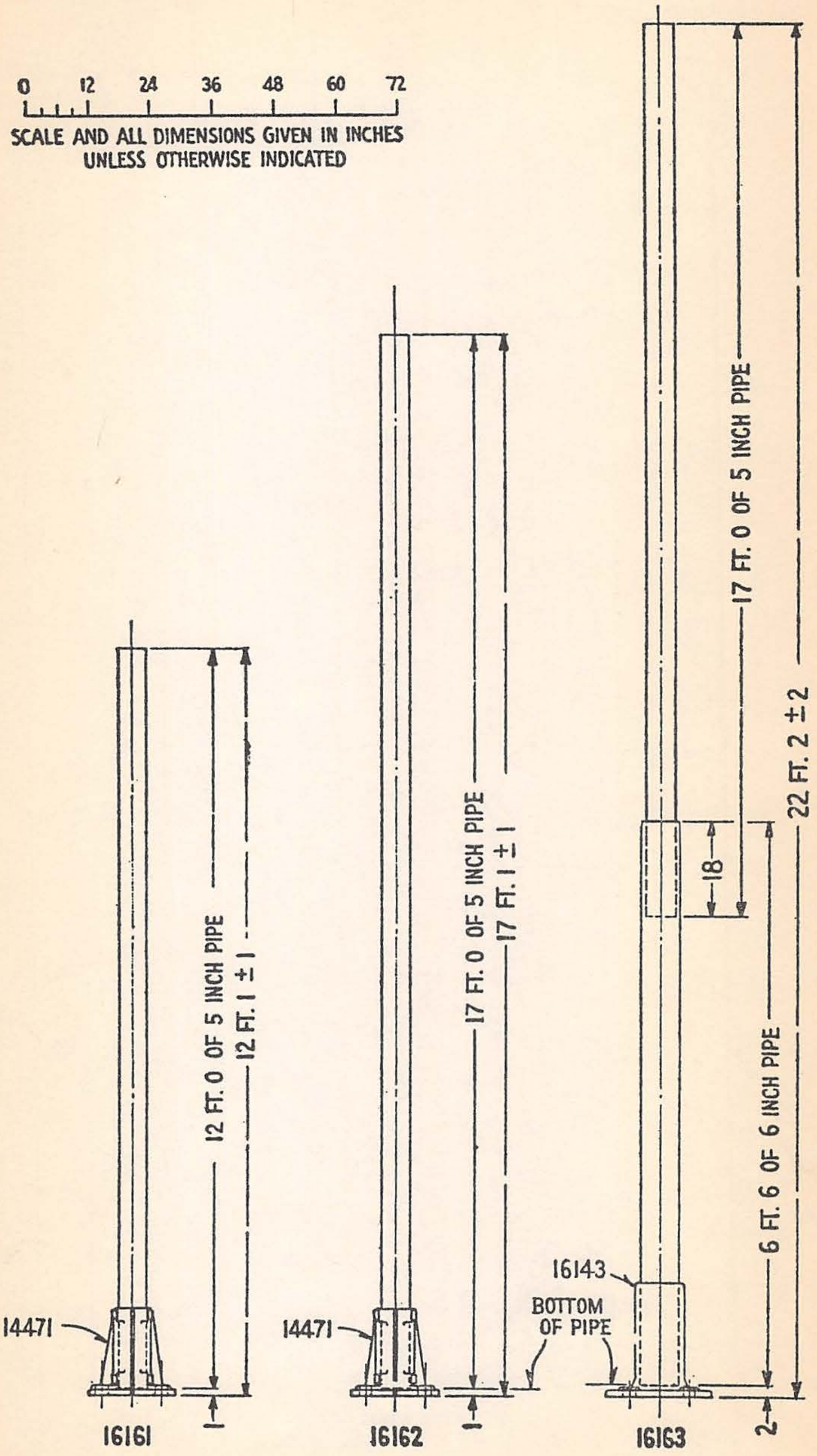

0
1
2
3
4
5
SCALE OF FEET
5" PIPE
12'-0"
14471
16161
5" PIPE
17'-0"
14471
16162
5" PIPE
22'-0"
6" PIPE
APPROXIMATELY 9'-0"
16143
16163

LIGHT SIGNAL MASTS

							M-1943	OCT. 1943	M-1929	MAR. 1929	SEP. 1928

AAR
SIG. SEC.
1616B

SPECIFICATION DEPT.
FEB 12 1948

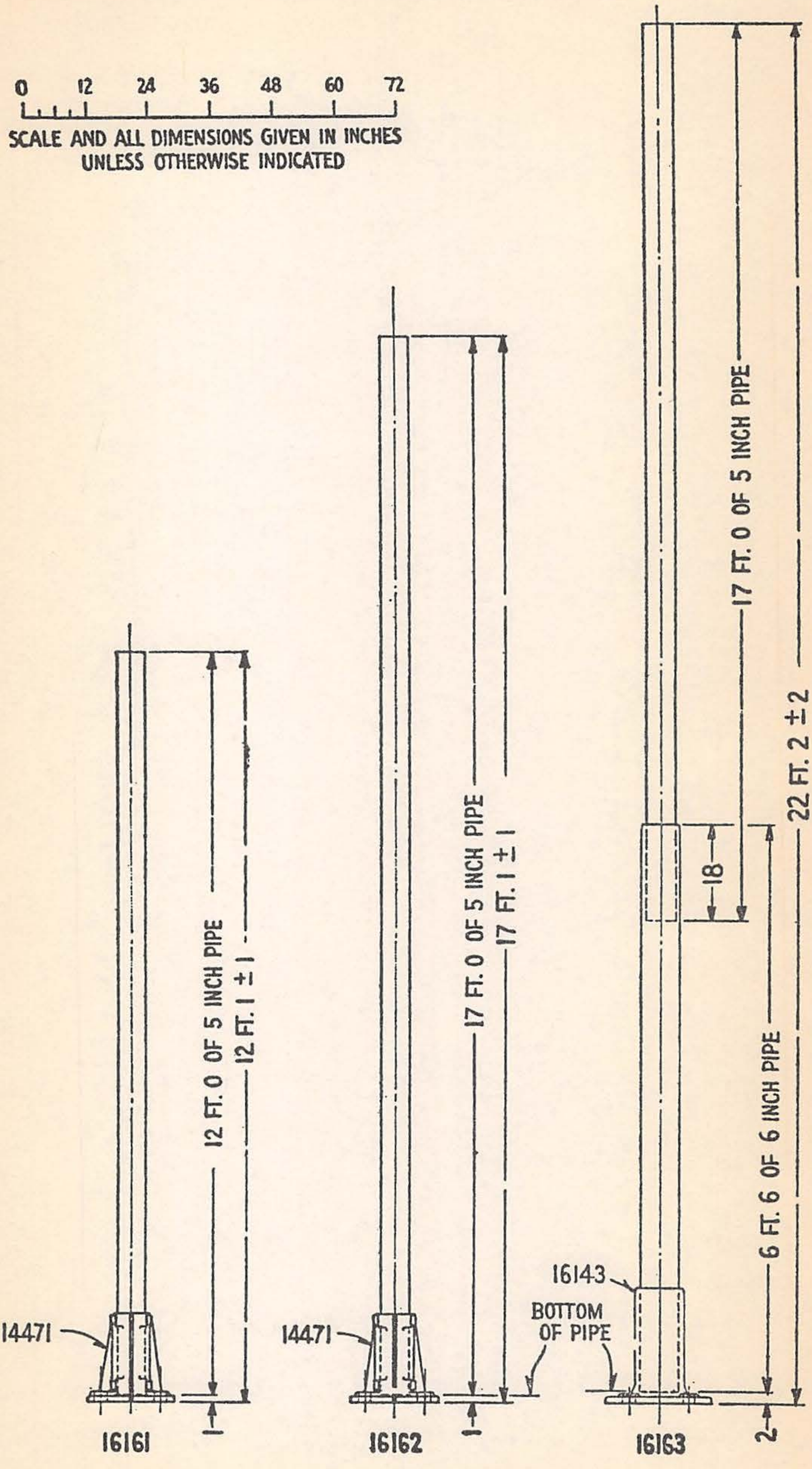

0
12
24
36
48
60
72
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
UNLESS OTHERWISE INDICATED
12 FT. 0 OF 5 INCH PIPE
12 FT. 1 ± 1
1
14471
16161
17 FT. 0 OF 5 INCH PIPE
17 FT. 1 ± 1
1
14471
16162
17 FT. 0 OF 5 INCH PIPE
22 FT. 2 ± 2
18
6 FT. 6 OF 6 INCH PIPE
16143
BOTTOM
OF PIPE
2
16163

LIGHT SIGNAL MASTS

					M-1947	SEP. 1947	M-1943	OCT. 1943	M-1929	MAR. 1929	SEP. 1928

AAR
SIG. SEC.
1616C

PRINTED IN U. S. A.


0
12
24
36
48
60
72
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
UNLESS OTHERWISE INDICATED
12 FT. 0 OF 5 INCH PIPE
12 FT. 1 ± 1
14471
1
16161
17 FT. 0 OF 5 INCH PIPE
17 FT. 1 ± 1
14471
1
16162
17 FT. 0 OF 5 INCH PIPE
22 FT. 2 ± 2
18
6 FT. 6 OF 6 INCH PIPE
16143
BOTTOM
OF PIPE
2
16163

LIGHT SIGNAL MASTS

					M-1947	SEP. 1947	M-1943	OCT. 1943	M-1929	MAR. 1929	SEP. 1928

AAR
SIG. SEC.
1616C

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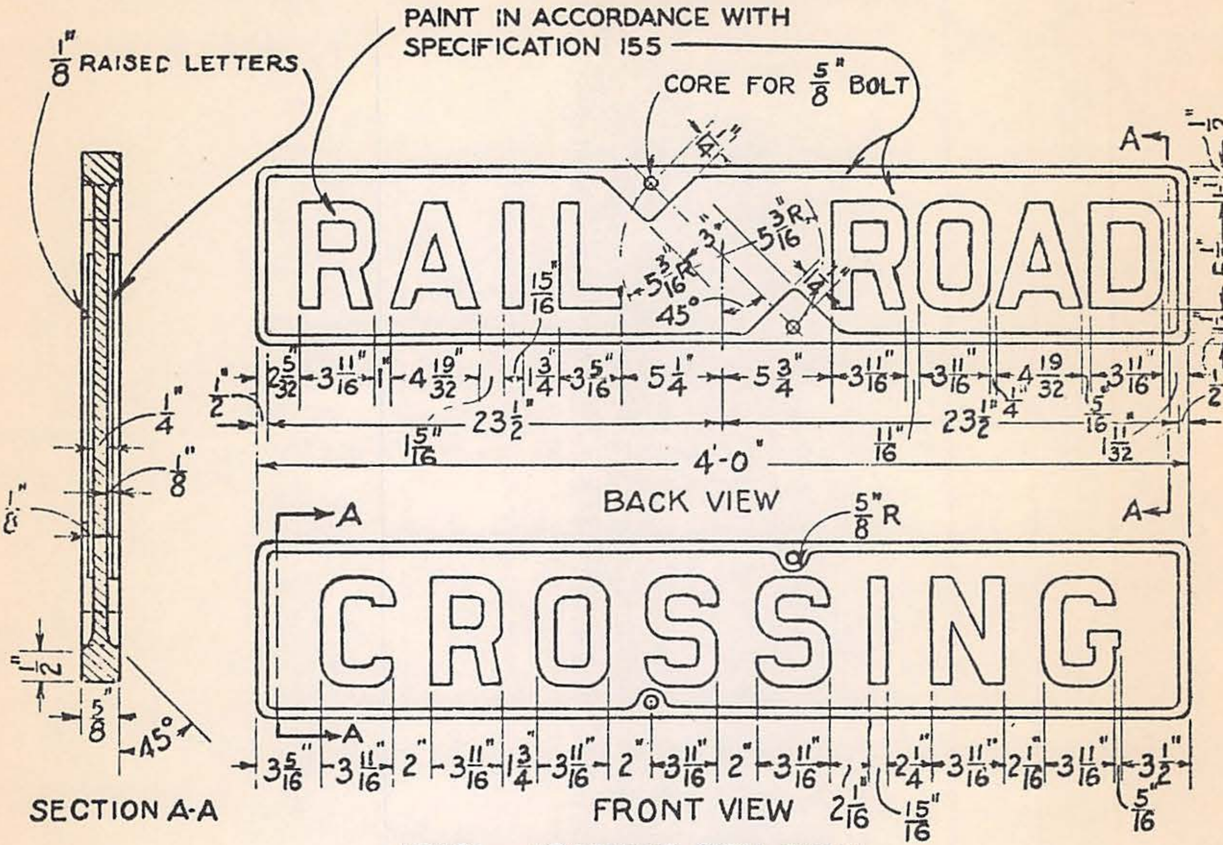
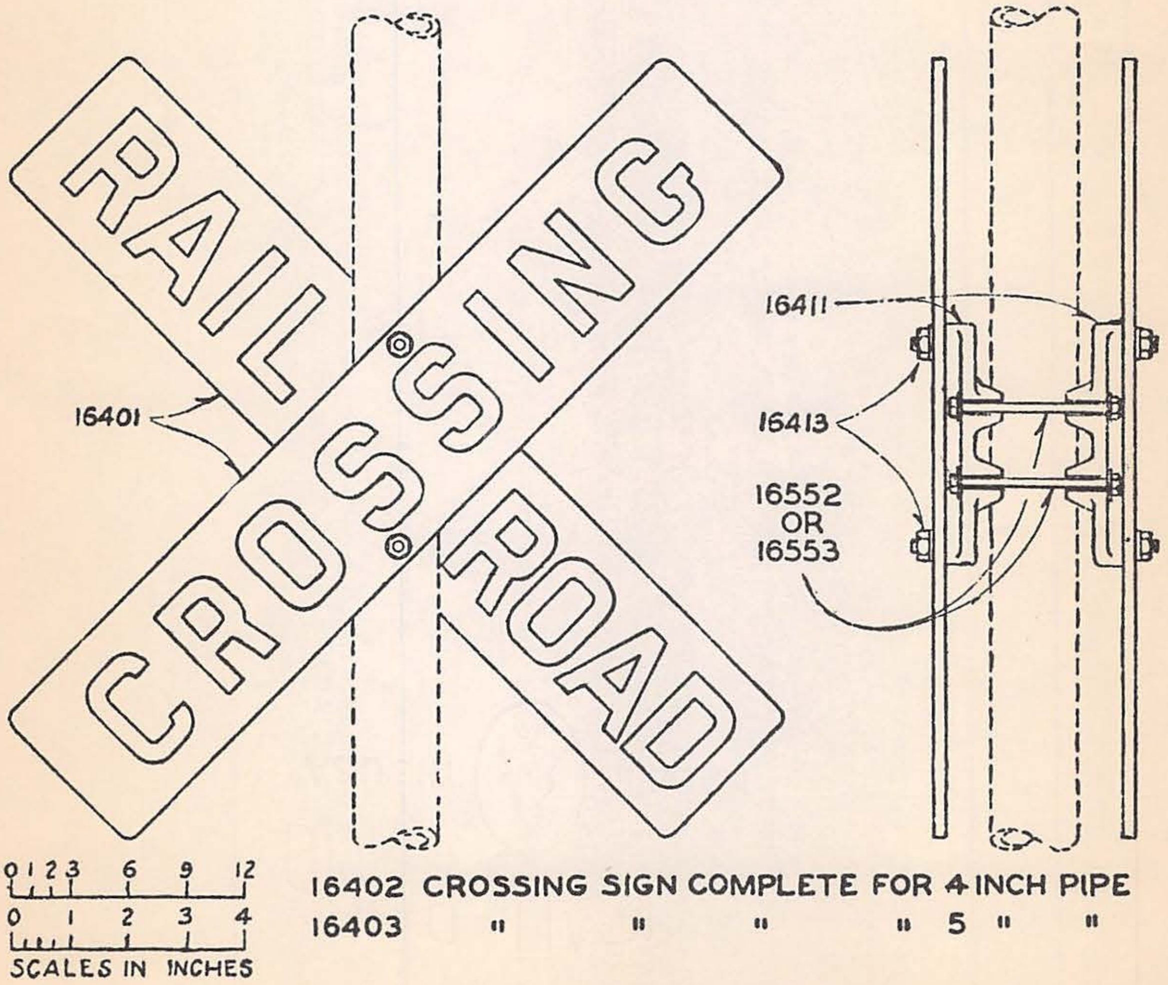


1/8" RAISED LETTERS
PAINT IN ACCORDANCE WITH SPECIFICATION 155
CORE FOR 5/8" BOLT
SECTION A-A
BACK VIEW
FRONT VIEW
A
A
5/8" R
45°
4'-0"
23 1/2"
23 1/2"
9"
5 1/2"
1 1/4"
1/2"
1/4"
1/8"
5/8"
15/16"
1 5/16"
11/16"
1 11/32"

16401 CROSSING SIGN ONLY
CAST IRON



16401
16411
16413
16552 OR 16553
0 1 2 3 6 9 12
0 1 2 3 4
SCALES IN INCHES

16402 CROSSING SIGN COMPLETE FOR 4 INCH PIPE
16403 " " " " 5 " "

90° CAST-IRON CROSSING SIGN

AAR SIG. SEC. 1640B

M-1937 MAR 1937 M-1933 MAY 1933

Material shall be in accordance with Specifications 120, 155 and Specification for Gray Iron Castings.

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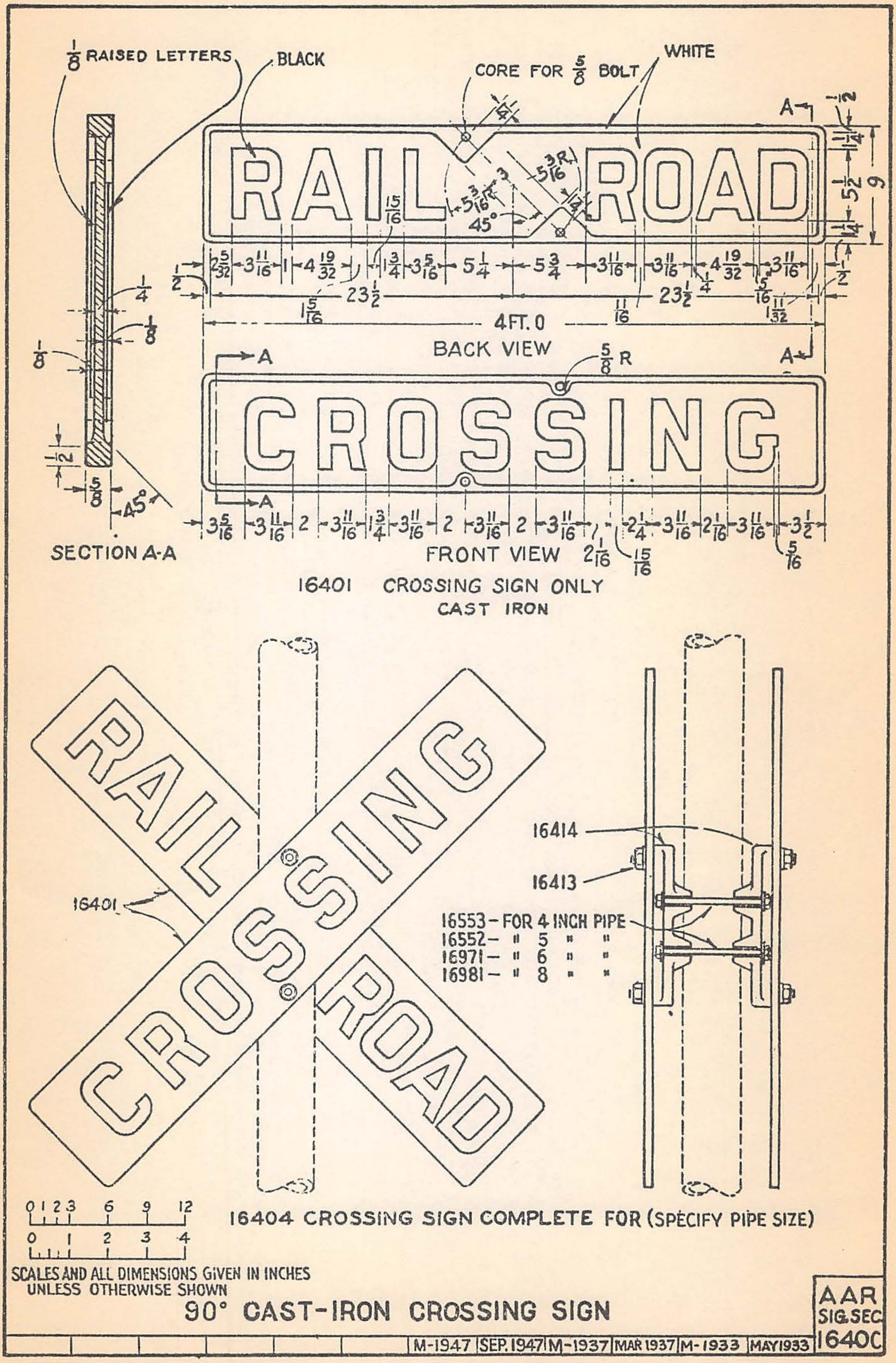
SPECIFICATION DEPT.
RECEIVED
FEB 12 1948


1/8 RAISED LETTERS
BLACK
WHITE
CORE FOR 5/8 BOLT
RAIL ROAD
CROSSING
BACK VIEW
FRONT VIEW
SECTION A-A
A
4 FT. 0
23 1/2
45°
5/8 R
9
16401 CROSSING SIGN ONLY
CAST IRON
16401
16414
16413
16553 - FOR 4 INCH PIPE
16552 - " 5 " "
16971 - " 6 " "
16981 - " 8 " "
16404 CROSSING SIGN COMPLETE FOR (SPECIFY PIPE SIZE)
0 1 2 3 6 9 12
0 1 2 3 4
SCALES AND ALL DIMENSIONS GIVEN IN INCHES UNLESS OTHERWISE SHOWN

90° CAST-IRON CROSSING SIGN

AAR SIG. SEC. 1640C

M-1947	SEP. 1947	M-1937	MAR 1937	M-1933	MAY 1933

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Painting shall be in accordance with Specification 155, Manual Part 44.

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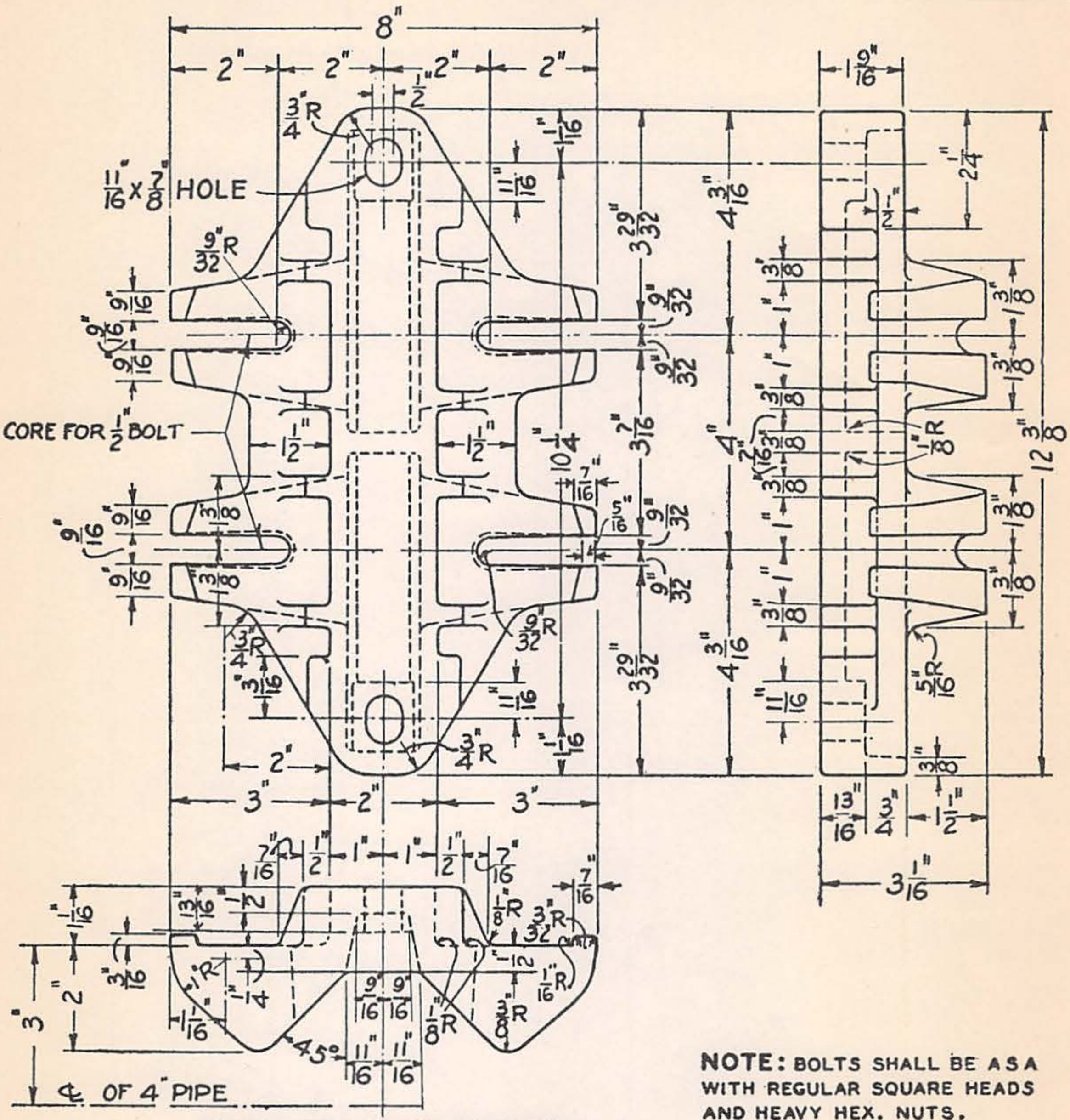
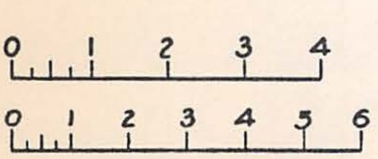


8"
2"
2"
2"
2"
1/2"
3/4" R
1/16"
11/16 x 7/8 HOLE
11/16"
3 29/32"
4 3/16"
1 9/16"
2 1/4"
1/2"
9/32" R
9/16"
9/32"
1 3/8"
1"
CORE FOR 1/2" BOLT
1 1/2"
10 1/4"
3 7/16"
4"
3/8"
2"
1 3/8"
1/8" R
12 3/8"
7/16"
5/16"
1/4"
3/4" R
5/16" R
3/16"
2"
3"
2"
3"
13/16"
3/4"
1 1/2"
3 1/16"
7/16"
1/2"
1"
1"
1/2"
7/16"
1/8" R
3/32" R
1/16"
13/16"
1 1/2"
3/16"
1" R
1/4"
1/16" R
2"
3"
9/16"
9/16"
1/8" R
3/4" R
1 1/16"
45°
11/16"
11/16"
℄ OF 4" PIPE

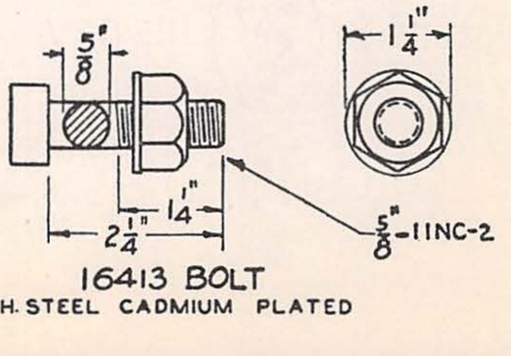
16411 ADAPTER CLAMP
(CAST IRON)

NOTE: BOLTS SHALL BE ASA WITH REGULAR SQUARE HEADS AND HEAVY HEX. NUTS.



0 1 2 3 4
0 1 2 3 4 5 6

SCALES IN INCHES



5/8"
1 1/4"
1 1/4"
2 1/4"
5/8"-11NC-2

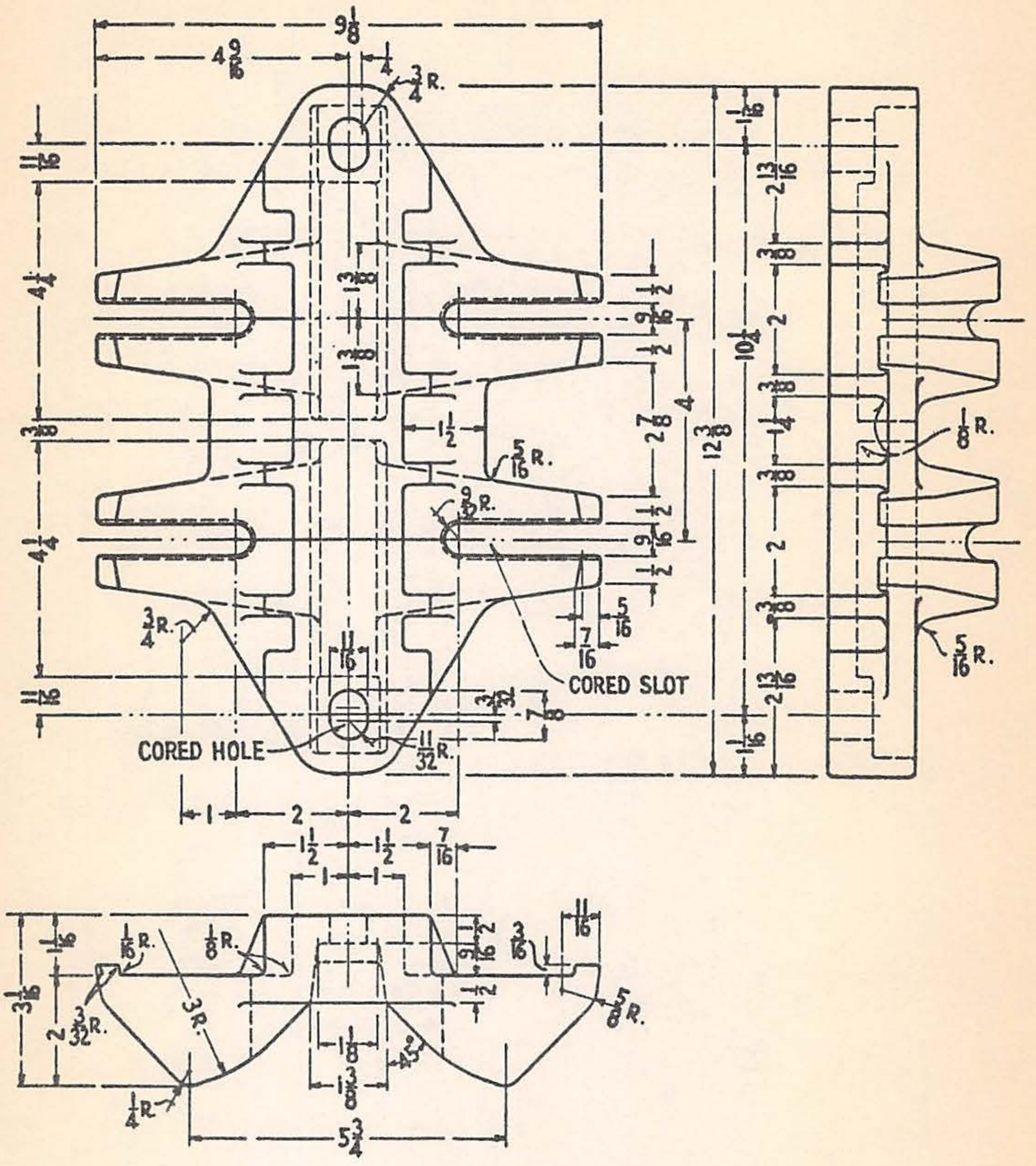
16413 BOLT
O-H. STEEL CADMIUM PLATED

ADAPTER CLAMP FOR CROSSING SIGNS

AAR
SIG. SEC.
1641B

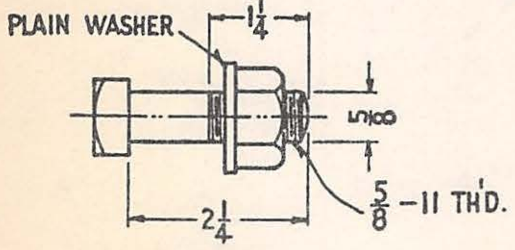
M-1937	MAR 1937	M-1933	MAY 1933

Material shall be in accordance with Specification 120 and Specification for Gray Iron Castings.



9 1/8
4 9/16
1/4
3/4 R.
11/16
4 1/4
3/8
4 1/4
11/16
1 3/8
1 3/8
1 1/2
5/16 R.
9/32 R.
9/16
1/2
2 7/8
4
12 3/8
10 1/4
1 1/16
2 13/16
3/8
2
1/8 R.
5/16 R.
3/4 R.
11/16
5/16
7/16
CORED SLOT
CORED HOLE
3/32
7/8
11/32 R.
1
2
2
1 1/2
1 1/2
7/16
1
1
3 1/16
1/16
1/16 R.
1/8 R.
2 3/32 R.
3 R.
3/16
11/16
5/8 R.
1/4 R.
1 1/8
1 3/8
45°
5 3/4

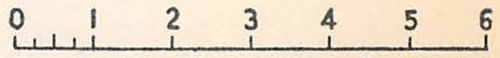
16414 ADAPTER CLAMP,
CAST IRON.



PLAIN WASHER
1 1/4
5/8
2 1/4
5/8 -11 TH'D.

16413 BOLT

BOLT, NUT AND WASHER SHALL BE GALVANIZED OR CADMIUM PLATED. GALVANIZING OR CADMIUM PLATING SHALL BE DONE AFTER THREADS HAVE BEEN CUT.



0 1 2 3 4 5 6
0 1 2 3 4 5 6 7 8

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

DOUBLE ADAPTER CLAMP AND DETAILS FOR CROSSING SIGNS
FOR 4 TO 8 INCH PIPE

AAR
SIG.SEC.
1641C

						M-1947	SEP. 1947	M-1937	MAR. 1937	M-1933	MAY 1933

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17; Painting shall be in accordance with Specification 120, Manual Part 110.

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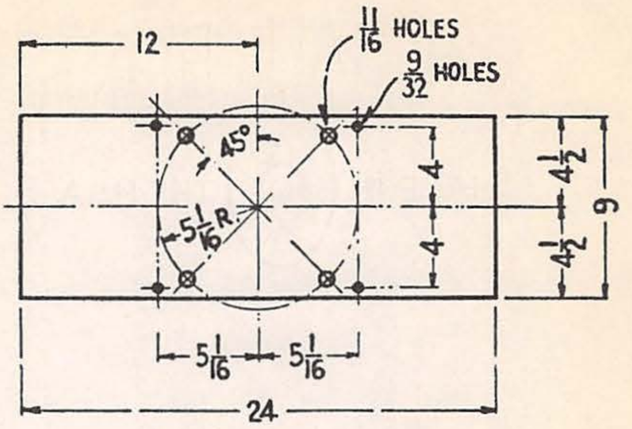
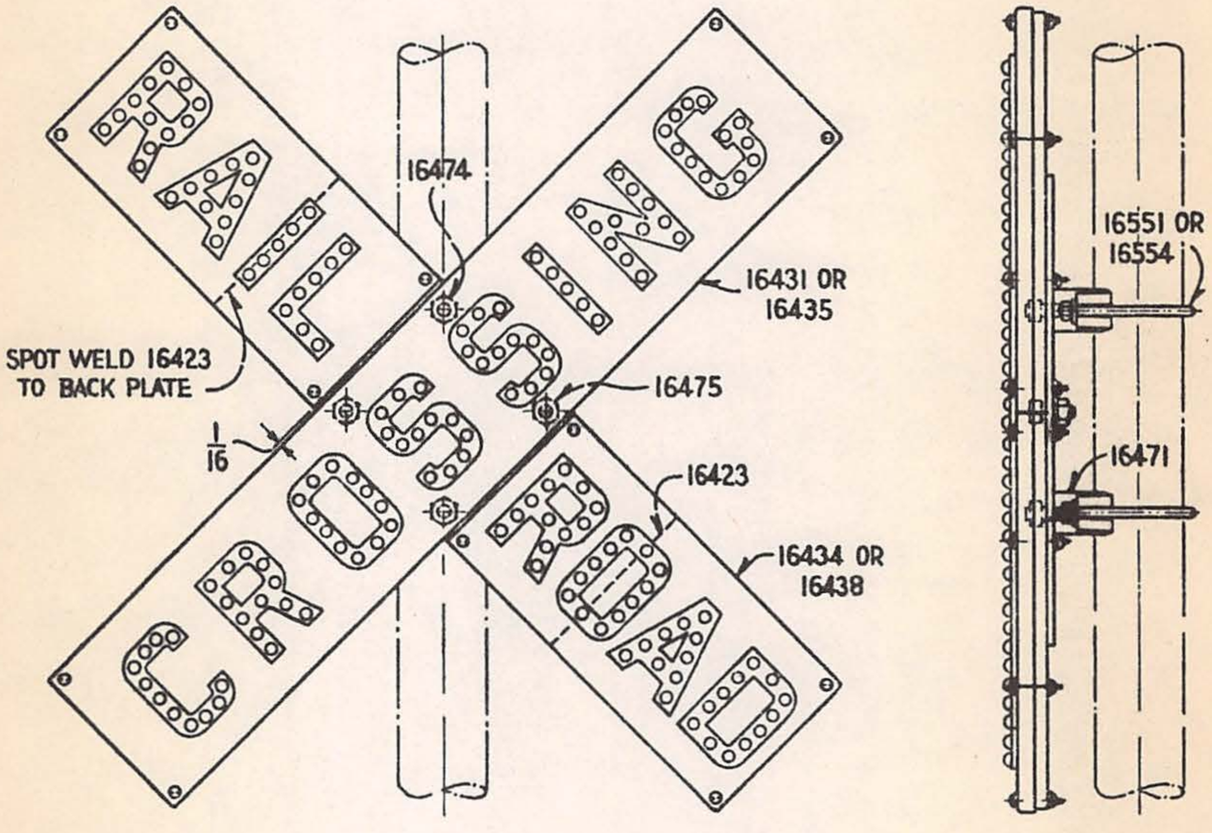

12
$\frac{11}{16}$ HOLES
$\frac{9}{32}$ HOLES
45°
$5\frac{1}{16}$R.
4
4
$4\frac{1}{2}$
$4\frac{1}{2}$
9
$5\frac{1}{16}$
$5\frac{1}{16}$
24

16423 SUPPORTING PLATE
$\frac{1}{4}$ IN. THICK, SAE-1020 STEEL


RAILROAD
CROSSING
16474
16431 OR 16435
SPOT WELD 16423 TO BACK PLATE
$\frac{1}{16}$
16475
16423
16434 OR 16438
16551 OR 16554
16471

16422	**RAILROAD**	**CROSSING**	**SIGN**	**COMPLETE,**	**SYNTHETIC**	**ENAMEL**	**FINISH,**	**4 IN.**	**PIPE**
16425	"	"	"	"	**VITREOUS**	"	"	"	"
16426	"	"	"	"	**SYNTHETIC**	"	"	**5 IN.**	**PIPE.**
16427	"	"	"	"	**VITREOUS**	"	"	"	"

ASSEMBLIES INCLUDE 16471, 16474, 16475, 16551 OR 16554

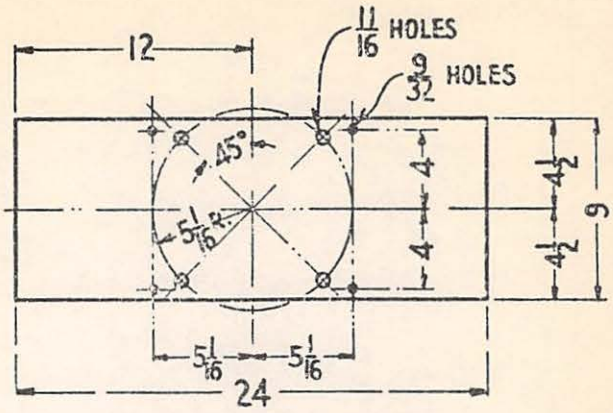
0 6 12 24
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

90° REFLECTOR CROSSING SIGN ASSEMBLY

AAR
SIG.SEC.
1642C

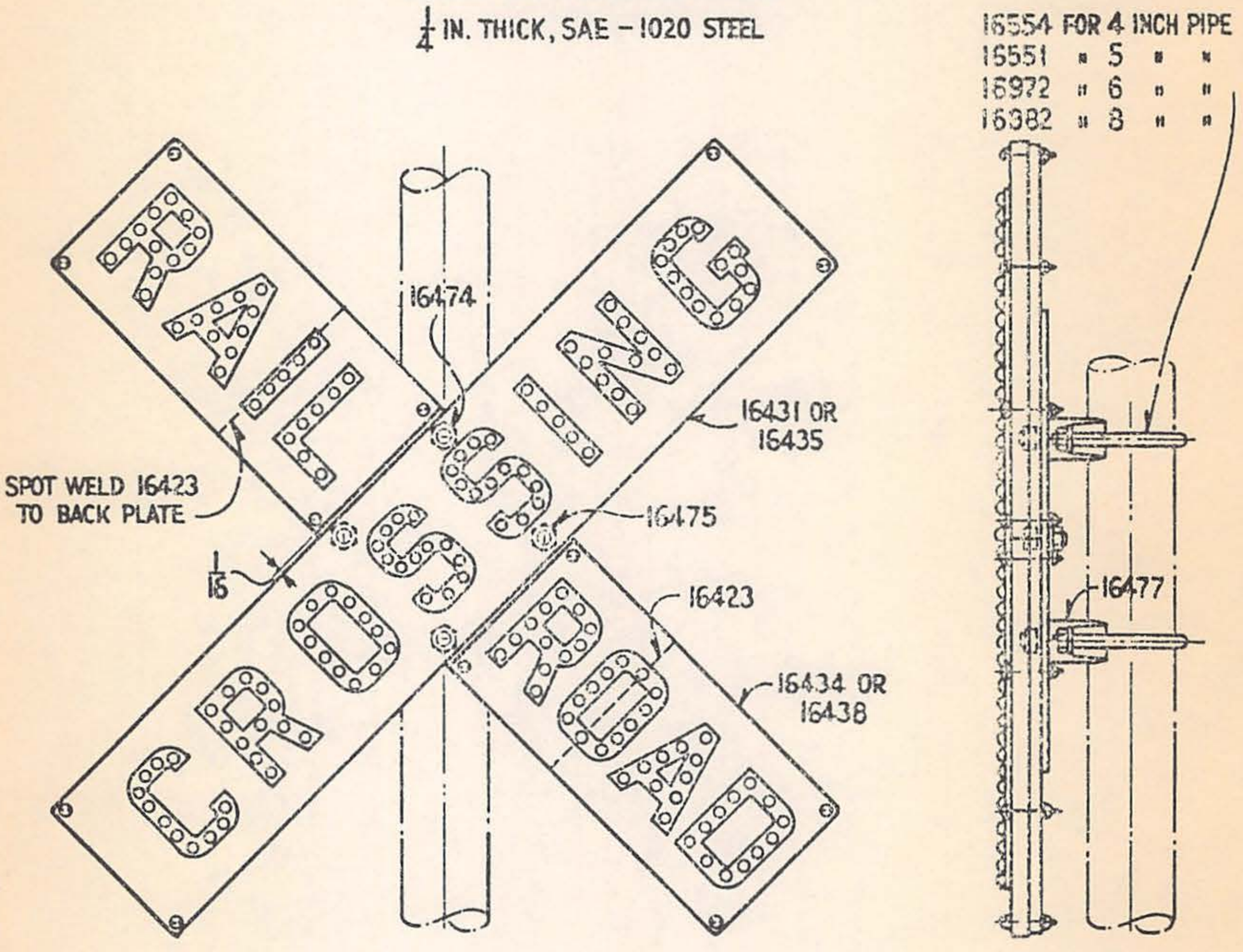
						M-1942	OCT. 1942	M-1937	MAR 1937	M-1933	MAY 1933

Material shall be in accordance with Specifications 155 and 156.


12
11/16 HOLES
9/32 HOLES
45°
5 1/16 R.
4
4
4 1/2
4 1/2
9
5 1/16
5 1/16
24

16423 SUPPORTING PLATE

1/4 IN. THICK, SAE – 1020 STEEL


16554 FOR 4 INCH PIPE
16551 " 5 " "
16972 " 6 " "
16982 " 8 " "
RAIL
ROAD
CROSSING
16474
16431 OR
16435
SPOT WELD 16423
TO BACK PLATE
16475
1/16
16423
16434 OR
16438
16477

16428 RAILROAD CROSSING SIGN COMPLETE, SYNTHETIC ENAMEL FINISH FOR (SPECIFY PIPE SIZE).

16429 RAILROAD CROSSING SIGN COMPLETE, VITREOUS ENAMEL FINISH FOR (SPECIFY PIPE SIZE).

0 6 12 24

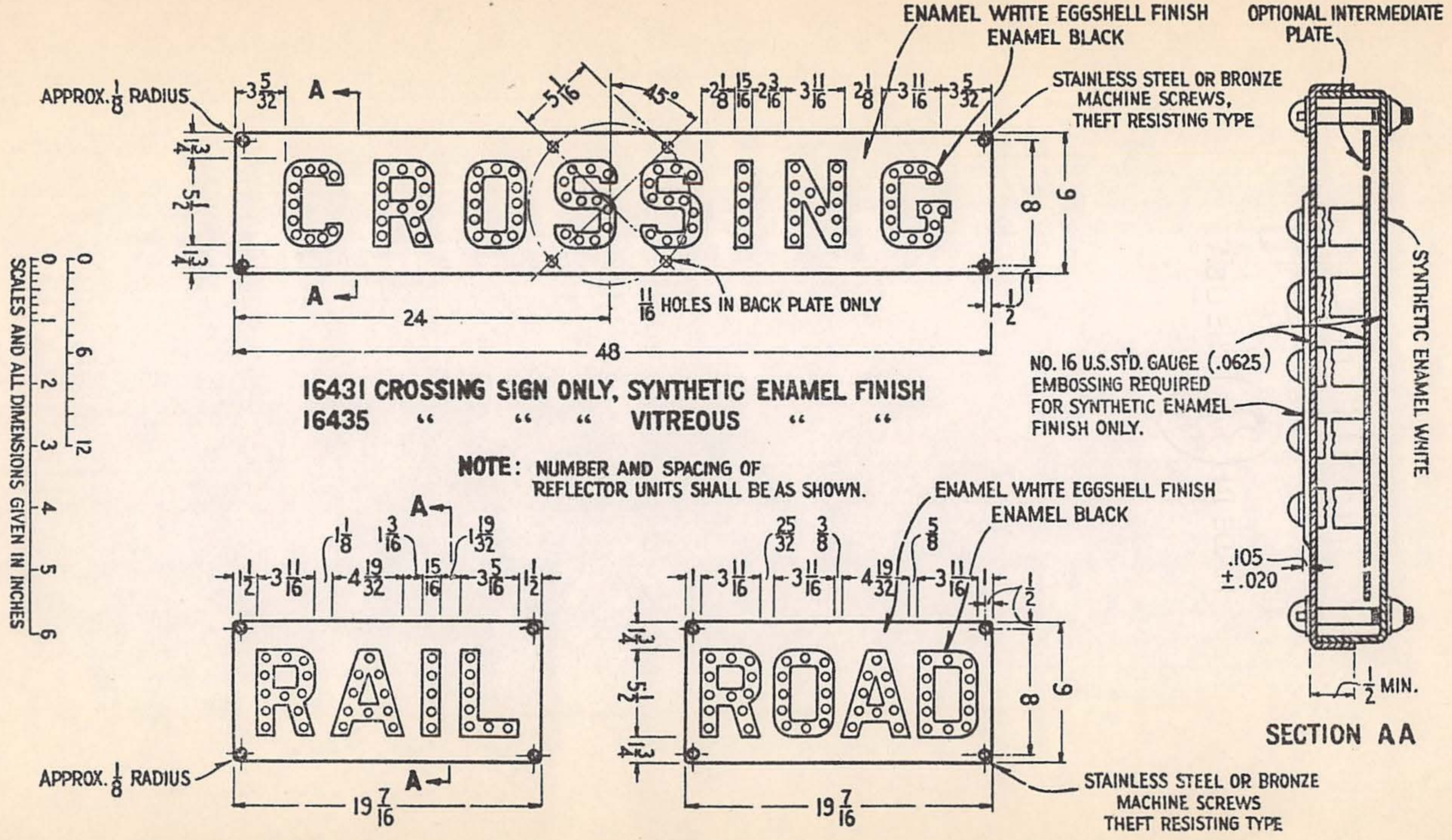
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

90° REFLECTOR CROSSING SIGN ASSEMBLY

AAR
SIG. SEC.
1642D

			M-1947	SEP. 1947	M-1942	OCT. 1942	M-1937	MAR. 1937	M-1933	MAY 1933

90° REFLECTOR CROSSING SIGN DETAILS



APPROX. 1/8 RADIUS
$3\frac{5}{32}$
A
$5\frac{1}{16}$
45°
$2\frac{1}{8}$ $\frac{15}{16}$ $2\frac{3}{16}$ $3\frac{11}{16}$ $2\frac{1}{8}$ $3\frac{11}{16}$ $3\frac{5}{32}$
ENAMEL WHITE EGGSHELL FINISH
ENAMEL BLACK
STAINLESS STEEL OR BRONZE MACHINE SCREWS, THEFT RESISTING TYPE
OPTIONAL INTERMEDIATE PLATE
CROSSING
$1\frac{3}{4}$
$5\frac{1}{2}$
$1\frac{3}{4}$
8
9
$\frac{11}{16}$ HOLES IN BACK PLATE ONLY
$\frac{1}{2}$
24
48
0 1 2 3 4 5 6
0 6 12
SCALES AND ALL DIMENSIONS GIVEN IN INCHES
SYNTHETIC ENAMEL WHITE
NO. 16 U.S.STD. GAUGE (.0625)
EMBOSSING REQUIRED FOR SYNTHETIC ENAMEL FINISH ONLY.
.105 ±.020
$\frac{1}{2}$ MIN.
SECTION AA
$1\frac{1}{8}$ $1\frac{3}{16}$ $1\frac{19}{32}$
$1\frac{1}{2}$ $3\frac{11}{16}$ $4\frac{19}{32}$ $\frac{15}{16}$ $3\frac{5}{16}$ $1\frac{1}{2}$
RAIL
APPROX. 1/8 RADIUS
$19\frac{7}{16}$
ENAMEL WHITE EGGSHELL FINISH
ENAMEL BLACK
$\frac{25}{32}$ $\frac{3}{8}$ $\frac{5}{8}$
1 $3\frac{11}{16}$ $3\frac{11}{16}$ $4\frac{19}{32}$ $3\frac{11}{16}$ 1 $\frac{1}{2}$
ROAD
$1\frac{3}{4}$
$5\frac{1}{2}$
$1\frac{3}{4}$
8
9
$19\frac{7}{16}$
STAINLESS STEEL OR BRONZE MACHINE SCREWS THEFT RESISTING TYPE

16431 CROSSING SIGN ONLY, SYNTHETIC ENAMEL FINISH
16435 " " " VITREOUS " "

NOTE: NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.

16432 RAIL SIGN ONLY, SYNTHETIC ENAMEL FINISH
16436 " " " VITREOUS " "

16433 ROAD SIGN ONLY, SYNTHETIC ENAMEL FINISH
16437 " " " VITREOUS " "

16434 RAIL AND ROAD SIGN 16432 AND 16433 ASSEMBLED WITH AND SPOT WELDED TO SUPPORTING PLATE 16423
16438 " " " " 16436 " 16437 " " " " " " " " "

M-1942	OCT. 1942
M-1937	MAR. 1937
M-1933	MAY 1933

AAR
SIG. SEC.
1643C

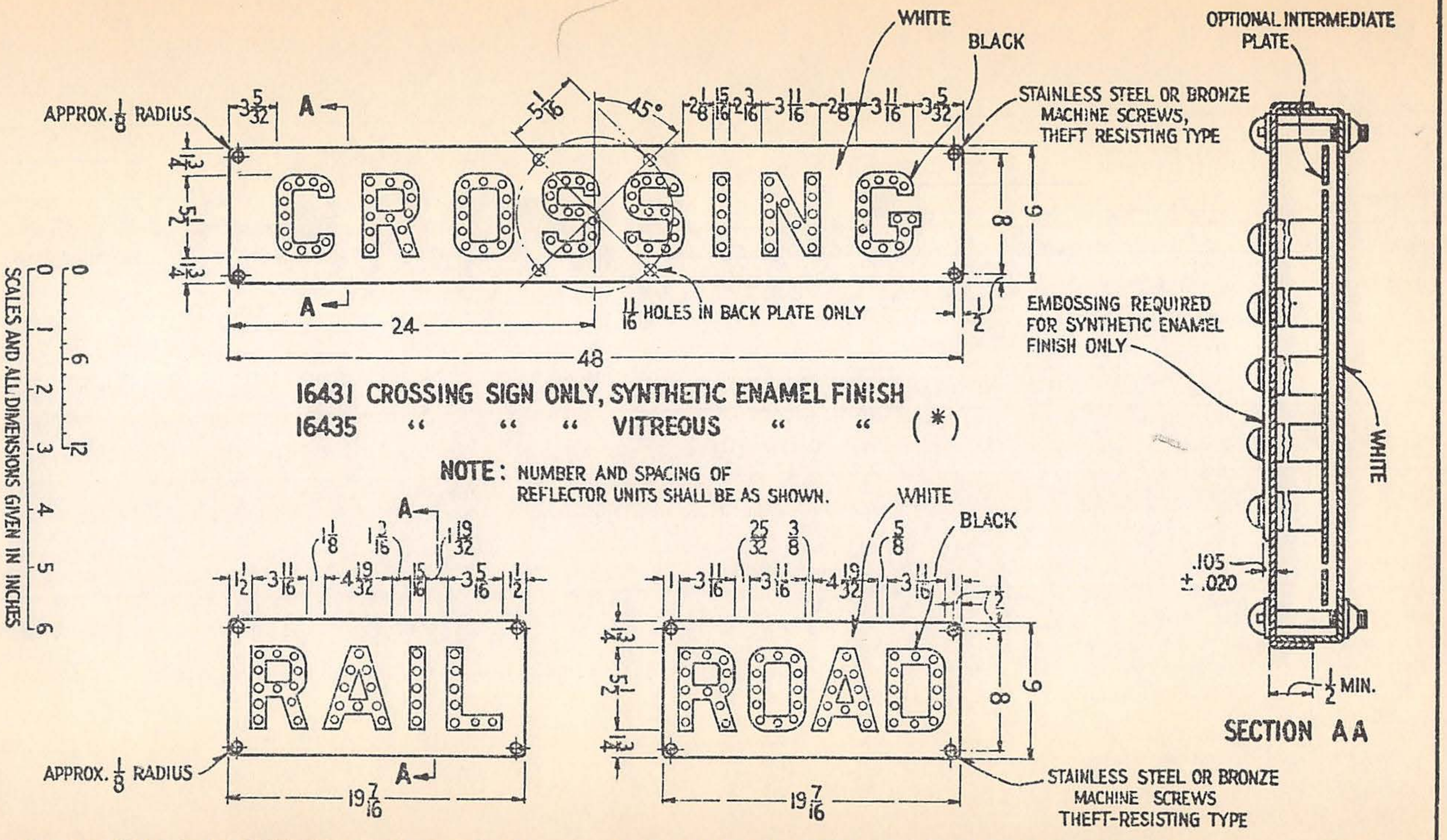
Material shall be in accordance with Specifications 155 and 156.

PRINTED IN U. S. A.

90° REFLECTOR CROSSING SIGN DETAILS

M-1947	SEP. 1947	M-1942	OCT. 1942	M-1937	MAR. 1937	M-1933	MAY 1933

AAR
SIG. SEC.
1643D



WHITE
BLACK
OPTIONAL INTERMEDIATE PLATE
APPROX. 1/8 RADIUS
3 5/32
A
5 1/16
45°
2 1/8
15/16
2 3/16
3 11/16
2 1/8
3 11/16
3 5/32
STAINLESS STEEL OR BRONZE MACHINE SCREWS, THEFT RESISTING TYPE
1 3/4
5 1/2
1 3/4
8
9
CROSSING
11/16 HOLES IN BACK PLATE ONLY
1/2
24
48
EMBOSSING REQUIRED FOR SYNTHETIC ENAMEL FINISH ONLY
WHITE
0 1 2 3 4 5 6
0 6 12
SCALES AND ALL DIMENSIONS GIVEN IN INCHES
NOTE: NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.
1 1/8
1 3/16
1 19/32
1 1/2
3 11/16
4 19/32
15/16
3 5/16
1 1/2
RAIL
APPROX. 1/8 RADIUS
19 7/16
WHITE
BLACK
25/32
3/8
5/8
1
3 11/16
3 11/16
4 19/32
3 11/16
1
1/2
1 3/4
5 1/2
1 3/4
8
9
ROAD
19 7/16
STAINLESS STEEL OR BRONZE MACHINE SCREWS THEFT-RESISTING TYPE
.105 ± .020
1/2 MIN.
SECTION AA

16431 CROSSING SIGN ONLY, SYNTHETIC ENAMEL FINISH
16435 " " " VITREOUS " " (*)

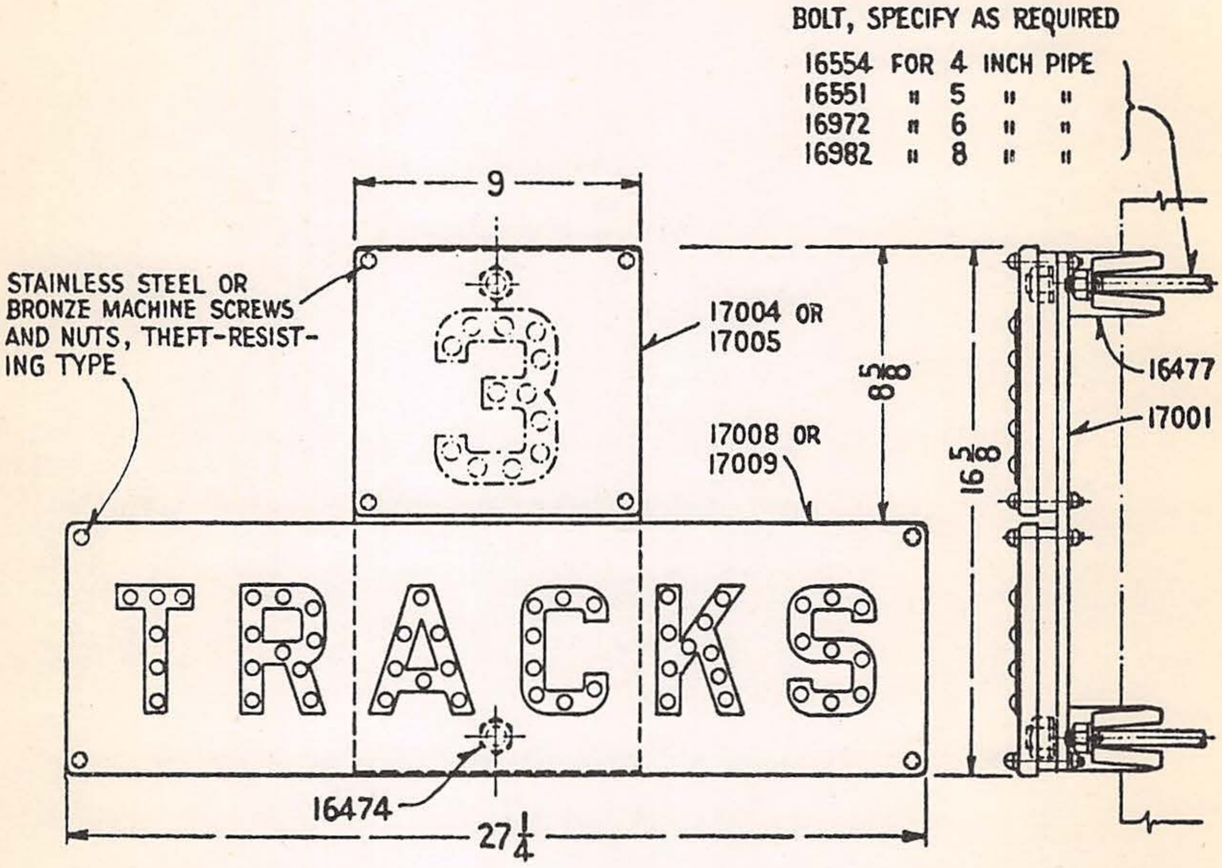
16432 RAIL SIGN ONLY, SYNTHETIC ENAMEL FINISH
16436 " " " VITREOUS " " (*)

16433 ROAD SIGN ONLY, SYNTHETIC ENAMEL FINISH
16437 " " " VITREOUS " " (*)

16434 RAIL AND ROAD SIGN 16432 AND 16433 ASSEMBLED WITH AND SPOT WELDED TO SUPPORTING PLATE 16423
16438 " " " " 16436 " 16437 " " " " " " " " "

(* ON FACE PLATE ONLY)

Material and painting shall be in accordance with Specifications 155 and 156, Manual Parts 44 and 43.


BOLT, SPECIFY AS REQUIRED
16554 FOR 4 INCH PIPE
16551 " 5 " "
16972 " 6 " "
16982 " 8 " "
9
STAINLESS STEEL OR BRONZE MACHINE SCREWS AND NUTS, THEFT-RESISTING TYPE
3
17004 OR 17005
8 5/8
16477
17001
17008 OR 17009
16 5/8
TRACKS
16474
27 1/4

164512 TRACKS SIGN COMPL.- SYNTHETIC ENAMEL FINISH, SPECIFY NUMERAL REQ'D.
164513 " " " VITREOUS . " " * " " "

* ON FRONT PLATES ONLY

0 1 2 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

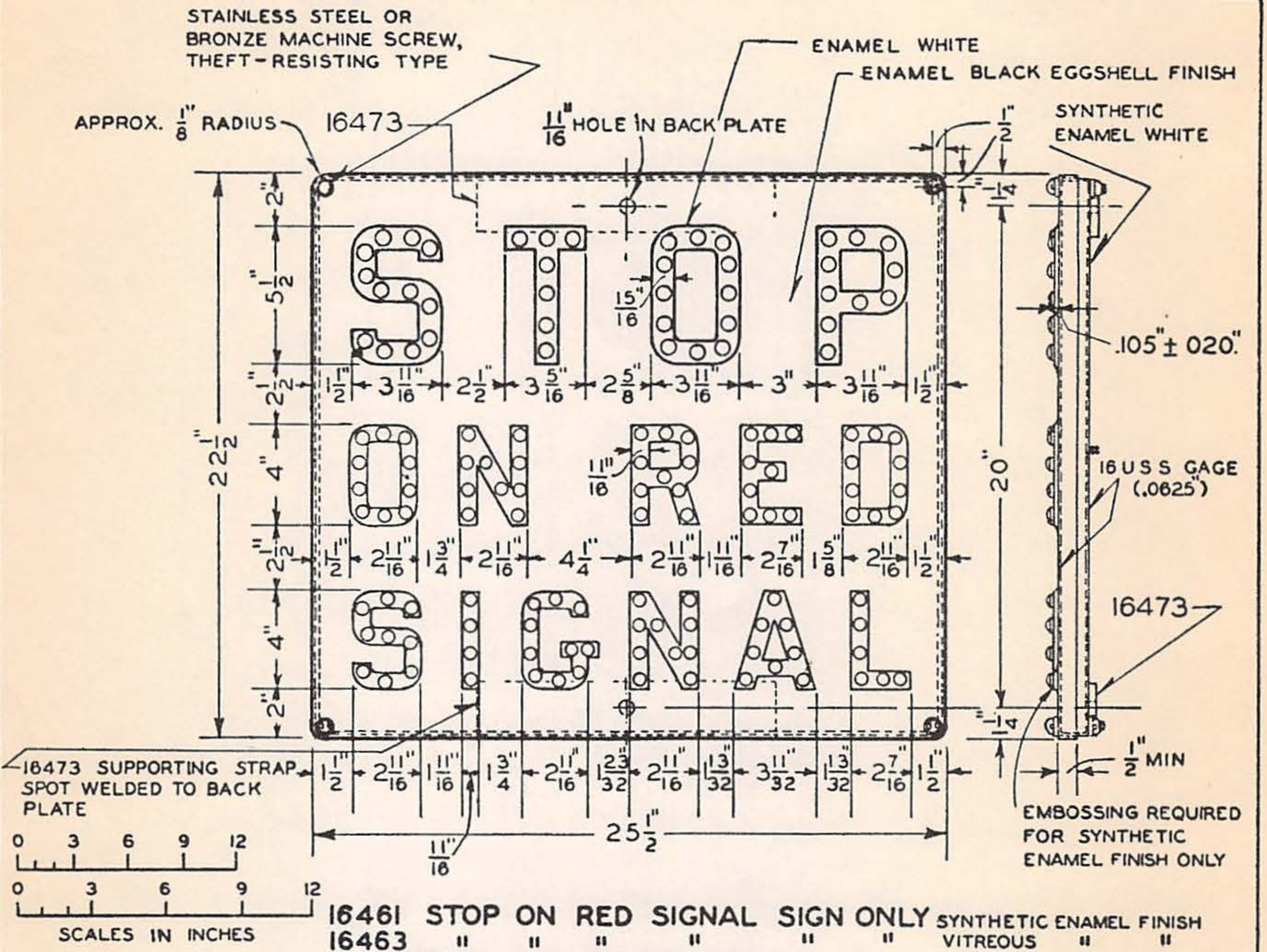
NUMBER OF TRACKS SIGN

REFLECTOR TYPE FOR 4 TO 8 INCH PIPE — ASSEMBLY

				M-1949	SEP.1949	M-1947	SEP.1947	M-1937	MAR.1937	M-1933	MAY 1933

AAR
SIG. SEC.
1645 D

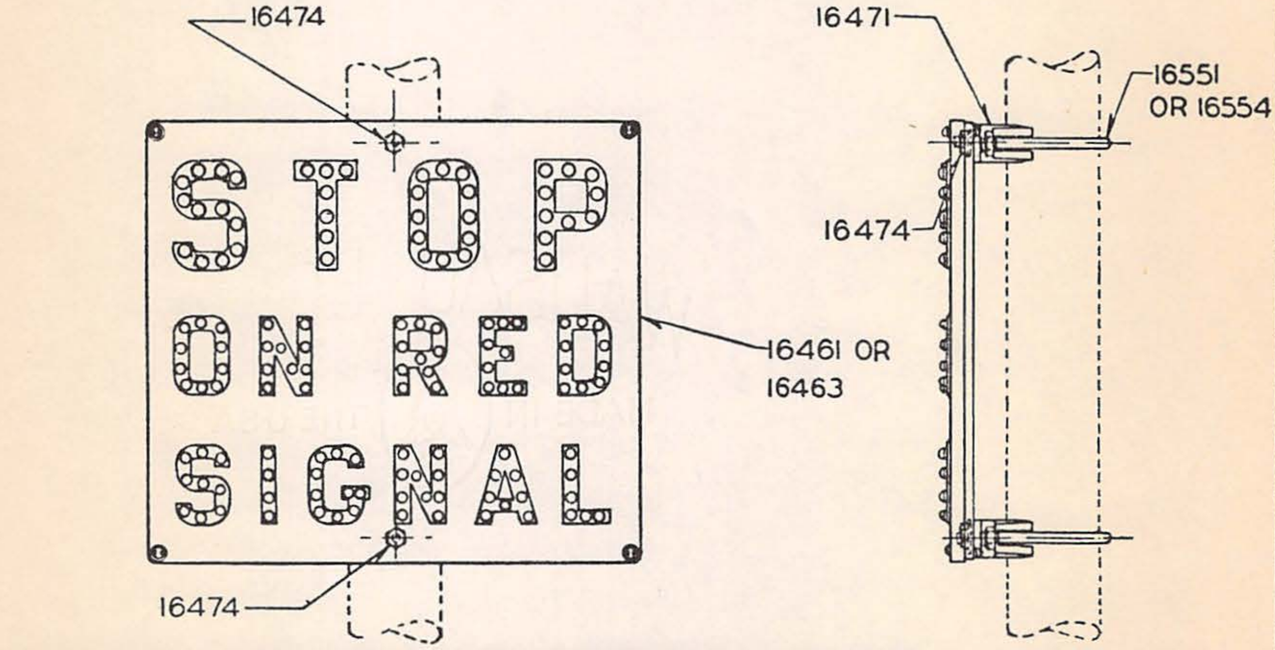
Material and painting shall be in accordance with Specification 155 and 156, Manual Parts 44 and 43.



STAINLESS STEEL OR BRONZE MACHINE SCREW, THEFT-RESISTING TYPE
ENAMEL WHITE
ENAMEL BLACK EGGSHELL FINISH
APPROX. 1/8" RADIUS
16473
11/16" HOLE IN BACK PLATE
1/2"
SYNTHETIC ENAMEL WHITE
1/4"
15/16"
.105" ± .020"
16 U S S GAGE (.0625")
11/16"
20"
22 1/2"
2"
5 1/2"
2 1/2"
4"
2 1/2"
4"
2"
1 1/2"
3 11/16"
2 1/2"
3 5/16"
2 5/8"
3 11/16"
3"
3 11/16"
1 1/2"
1 1/2"
2 11/16"
1 3/4"
2 11/16"
4 1/4"
2 11/16"
11/16"
2 7/16"
1 5/8"
2 11/16"
1 1/2"
STOP
ON RED
SIGNAL
16473
1/4"
16473 SUPPORTING STRAP SPOT WELDED TO BACK PLATE
1 1/2"
2 11/16"
11/16"
1 3/4"
2 11/16"
1 23/32
2 11/16"
1 13/32
3 11/32
1 13/32
2 7/16"
1 1/2"
1/2" MIN
EMBOSSING REQUIRED FOR SYNTHETIC ENAMEL FINISH ONLY
25 1/2"
11/16"
0 3 6 9 12
0 3 6 9 12
SCALES IN INCHES

16461 STOP ON RED SIGNAL SIGN ONLY SYNTHETIC ENAMEL FINISH
16463 " " " " " " VITREOUS " "

NOTE: NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.



16474
16471
16551 OR 16554
STOP
ON RED
SIGNAL
16474
16461 OR 16463
16474

16462 STOP ON RED SIGNAL SIGN COMPLETE, SYNTHETIC ENAMEL FINISH, FOR 4 INCH PIPE
16464 " " " " " " VITREOUS " " " 4 " "
16465 " " " " " " SYNTHETIC " " " 5 " "
16466 " " " " " " VITREOUS " " " 5 " "

REFLECTOR STOP ON RED SIGNAL SIGN

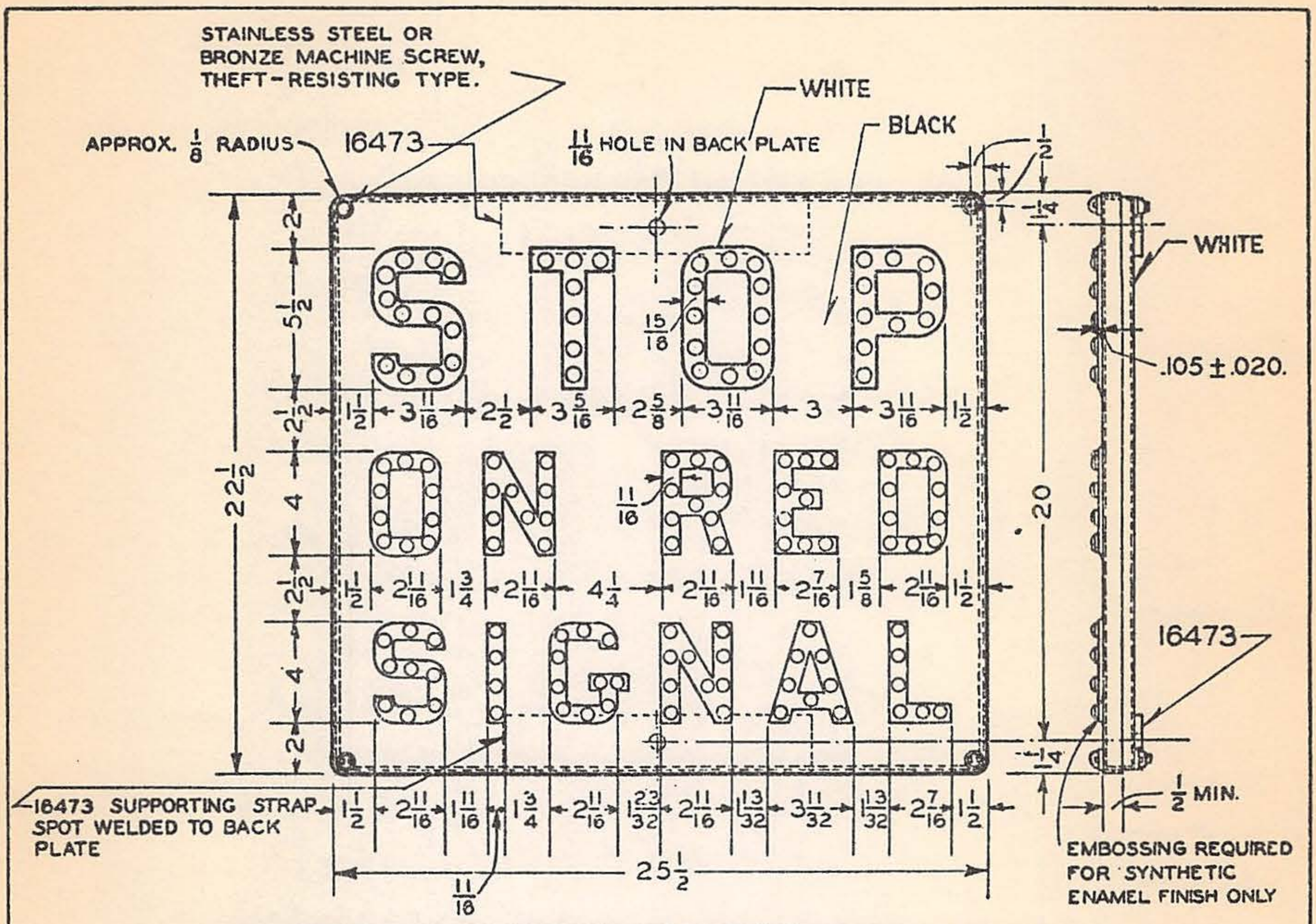
AAR
SIG. SEC.
1646B

M-1937 | MAR 1937 | M-1933 | MAY 1933

Material shall be in accordance with Specifications 155 and 156.

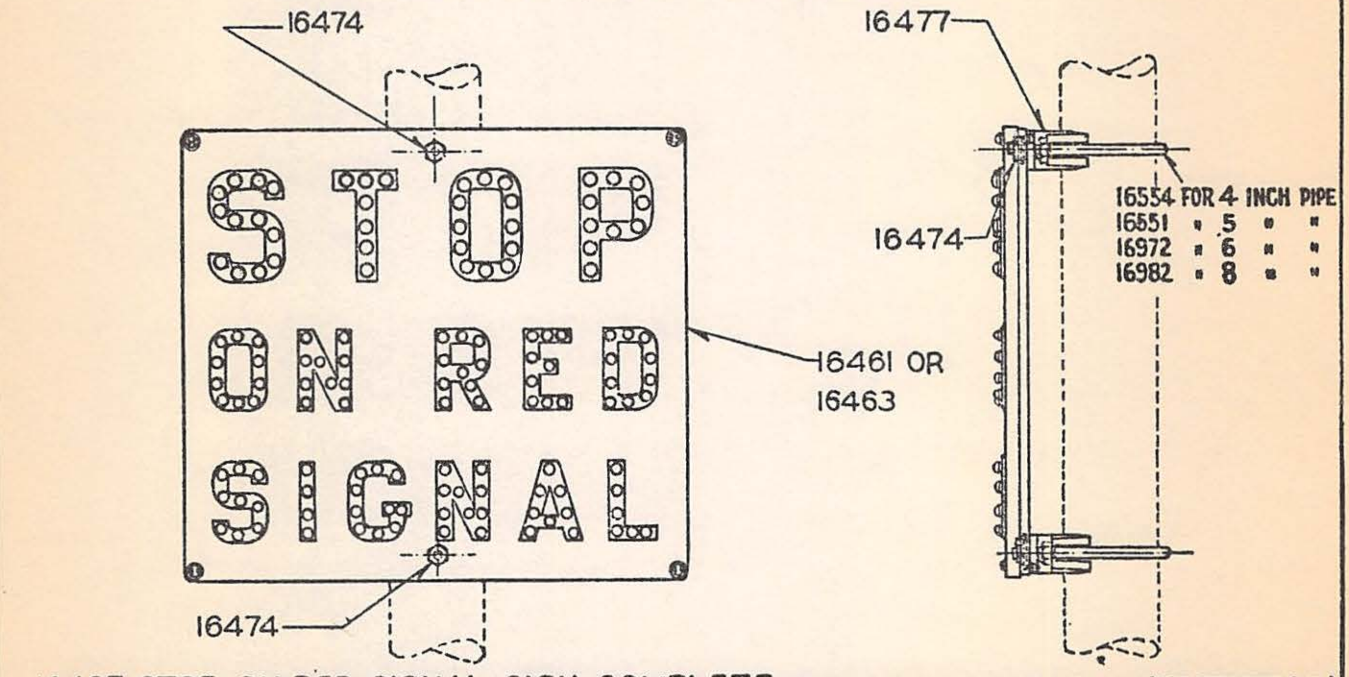
PRINTED IN U. S. A.

SPECIFICATION DEPT.
RETURNED
FEB 12 1948

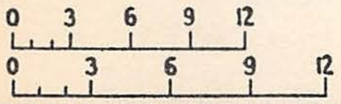

STAINLESS STEEL OR BRONZE MACHINE SCREW, THEFT-RESISTING TYPE.
APPROX. $\frac{1}{8}$ RADIUS
16473
$\frac{11}{16}$ HOLE IN BACK PLATE
WHITE
BLACK
$\frac{1}{2}$
$1\frac{1}{4}$
WHITE
.105 ± .020.
STOP
ON RED
SIGNAL
$\frac{15}{16}$
$\frac{11}{16}$
2
$5\frac{1}{2}$
$2\frac{1}{2}$
4
$2\frac{1}{2}$
4
2
$22\frac{1}{2}$
$1\frac{1}{2}$ $3\frac{11}{16}$ $2\frac{1}{2}$ $3\frac{5}{16}$ $2\frac{5}{8}$ $3\frac{11}{16}$ 3 $3\frac{11}{16}$ $1\frac{1}{2}$
$1\frac{1}{2}$ $2\frac{11}{16}$ $1\frac{3}{4}$ $2\frac{11}{16}$ $4\frac{1}{4}$ $2\frac{11}{16}$ $1\frac{11}{16}$ $2\frac{7}{16}$ $1\frac{5}{8}$ $2\frac{11}{16}$ $1\frac{1}{2}$
$1\frac{1}{2}$ $2\frac{11}{16}$ $1\frac{11}{16}$ $1\frac{3}{4}$ $2\frac{11}{16}$ $1\frac{23}{32}$ $2\frac{11}{16}$ $1\frac{13}{32}$ $3\frac{11}{32}$ $1\frac{13}{32}$ $2\frac{7}{16}$ $1\frac{1}{2}$
20
16473
$1\frac{1}{4}$
$\frac{1}{2}$ MIN.
16473 SUPPORTING STRAP SPOT WELDED TO BACK PLATE
$\frac{11}{16}$
$25\frac{1}{2}$
EMBOSSING REQUIRED FOR SYNTHETIC ENAMEL FINISH ONLY

16461 STOP ON RED SIGNAL SIGN ONLY SYNTHETIC ENAMEL FINISH.
16463 " " " " " " VITREOUS " " (ON FACE PLATE ONLY)

NOTE: NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.


16474
16477
STOP
ON RED
SIGNAL
16554 FOR 4 INCH PIPE
16551 " 5 " "
16972 " 6 " "
16982 " 8 " "
16474
16461 OR
16463
16474

16467 STOP ON RED SIGNAL SIGN COMPLETE, SYNTHETIC ENAMEL FINISH, FOR (SPECIFY PIPE SIZE)
16468 " " " " " " VITREOUS " " " " " "


0 3 6 9 12
0 3 6 9 12

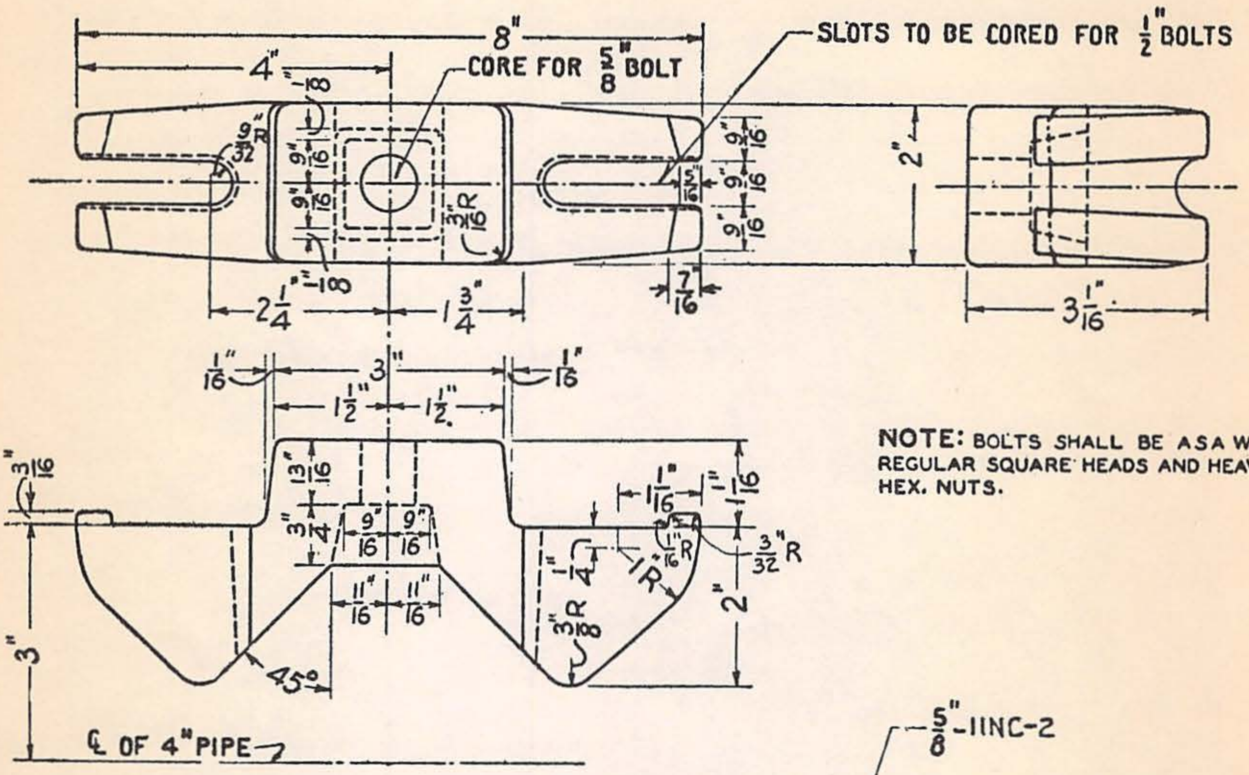
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

REFLECTOR STOP ON RED SIGNAL SIGN

						M-1947	SEP. 1947	M-1937	MAR 1937	M-1933	MAY 1933

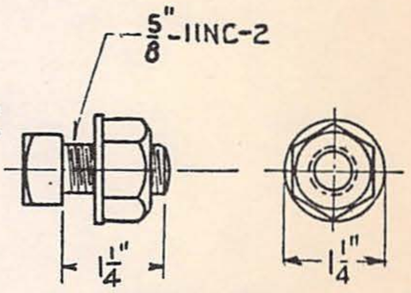
AAR SIG. SEC. 1646C

Material and painting shall be in accordance with Specifications 155 and 156, Manual Parts 44 and 43.

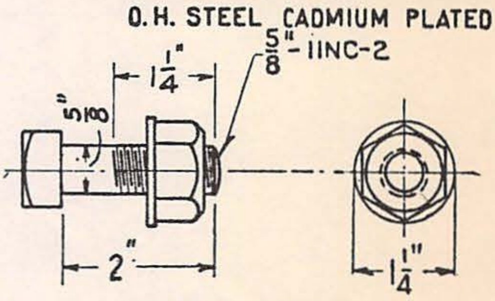

8"
4"
1/8"
CORE FOR 5/8" BOLT
SLOTS TO BE CORED FOR 1/2" BOLTS
9/32" R
9/16"
9/16"
3/16" R
5/16"
9/16"
9/16"
9/16"
1/8"
7/16"
2"
2 1/4"
1 3/4"
3 1/16"
1/16"
3"
1/16"
1 1/2"
1 1/2"
3/16"
13/16"
3/4"
9/16"
9/16"
11/16"
11/16"
1 1/16"
1"
1 1/16"
1/16" R
3/32" R
1/4"
1" R
2"
3/8" R
3"
45°
℄ OF 4" PIPE

NOTE: BOLTS SHALL BE ASA WITH REGULAR SQUARE HEADS AND HEAVY HEX. NUTS.

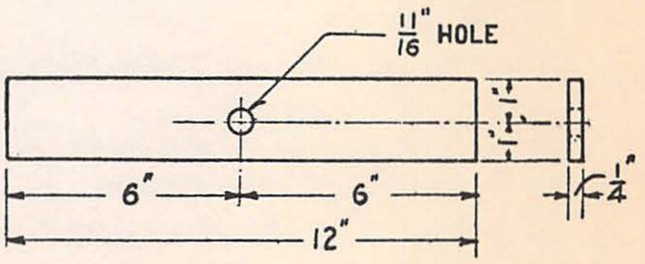
16471 ADAPTER CLAMP FOR 4" OR 5" PIPE
CAST IRON


5/8"-11NC-2
1 1/4"
1 1/4"

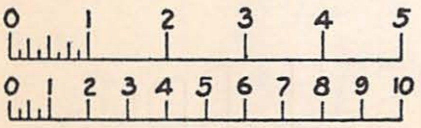
16475 BOLT
O. H. STEEL CADMIUM PLATED


1 1/4"
5/8"-11NC-2
5/8"
2"
1 1/4"

16474 BOLT
O. H. STEEL CADMIUM PLATED


11/16" HOLE
6"
6"
12"
1"
1/4"

16473 STRAP
O. H. STEEL


0 1 2 3 4 5
0 1 2 3 4 5 6 7 8 9 10

SCALES IN INCHES

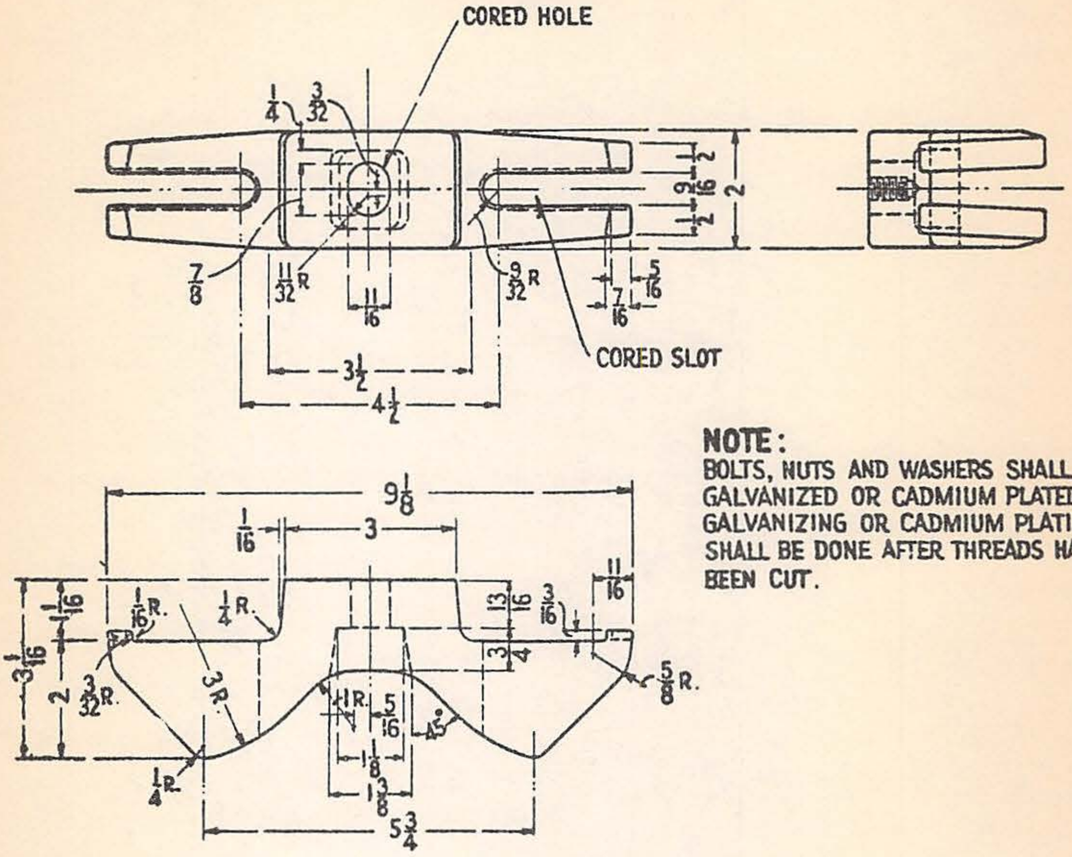
ADAPTER CLAMP AND DETAILS FOR SIGNS

AAR
SIG. SEC.
1647C

					M-1937	MAR 1937	M-1936	MAR 1936	M-1933	MAY 1933

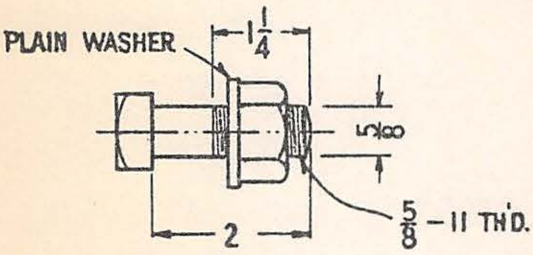
Material shall be in accordance with Specification 120 and Specification for Gray Iron Castings.

SPECIFICATION DEPT
RECEIVED
FEB 12 1948

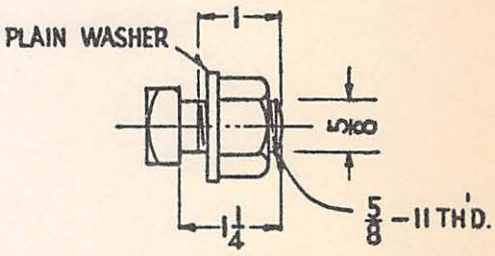

CORED HOLE
1/4
3/32
7/8
11/32 R
11/16
9/32 R
9/16
1/2
1/2
2
5/16
7/16
3 1/2
4 1/2
CORED SLOT
9 1/8
1/16
3
11/16
1/16
1/16 R.
1/4 R.
3 R.
13/16
3/16
3/4
5/8 R.
3 1/16
2
3/32 R.
1 R.
5/16
45°
1 1/8
1 3/8
1/4 R.
5 3/4

NOTE:
BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED OR CADMIUM PLATED. GALVANIZING OR CADMIUM PLATING SHALL BE DONE AFTER THREADS HAVE BEEN CUT.

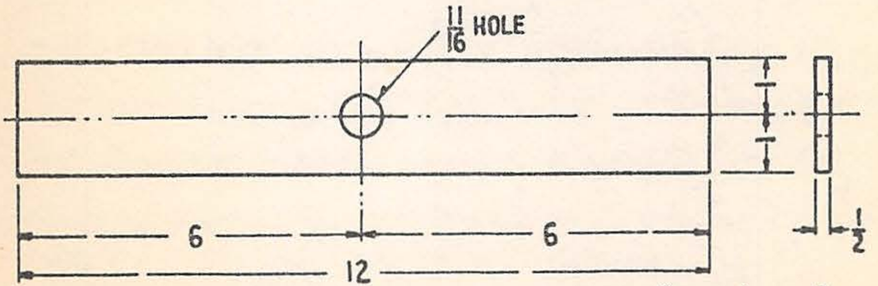
16477 ADAPTER CLAMP,
CAST IRON.


PLAIN WASHER
1 1/4
5/8
2
5/8 – 11 TH'D.

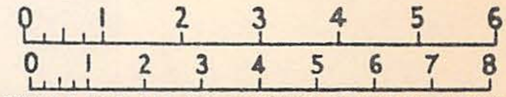
16474 BOLT.


PLAIN WASHER
1
5/8
1 1/4
5/8 – 11 TH'D.

16475 BOLT.


11/16 HOLE
1
1
6
6
12
1/2

16473 STRAP,
SAE-1020 STEEL


0 1 2 3 4 5 6
0 1 2 3 4 5 6 7 8

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

SINGLE ADAPTER CLAMP AND DETAILS FOR CROSSING SIGNS
FOR 4 TO 8 INCH PIPE

				M-1947	SEP. 1947	M-1937	MAR. 1937	M-1936	MAR. 1936	M-1933	MAY 1933

AAR
SIG. SEC.
1647 D

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17; Painting shall be in accordance with Specification 120, Manual Part 110.

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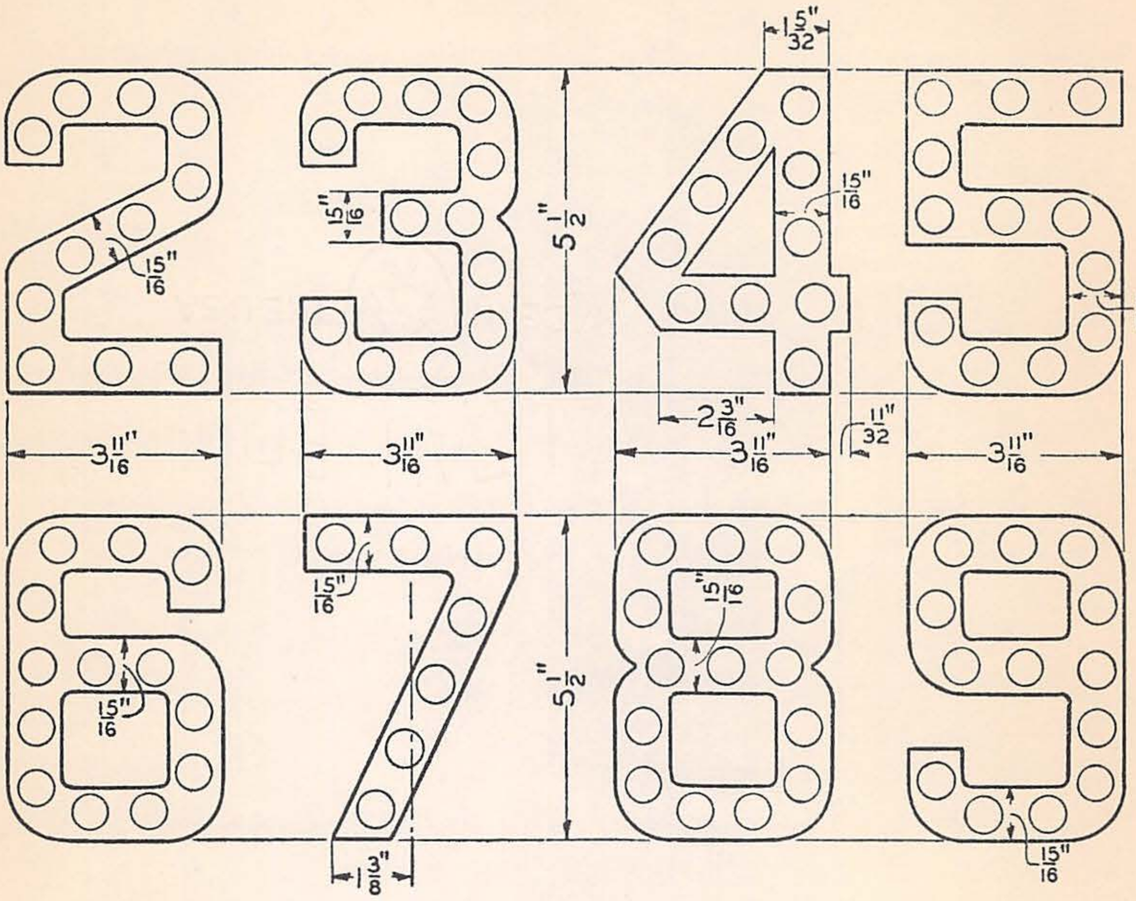
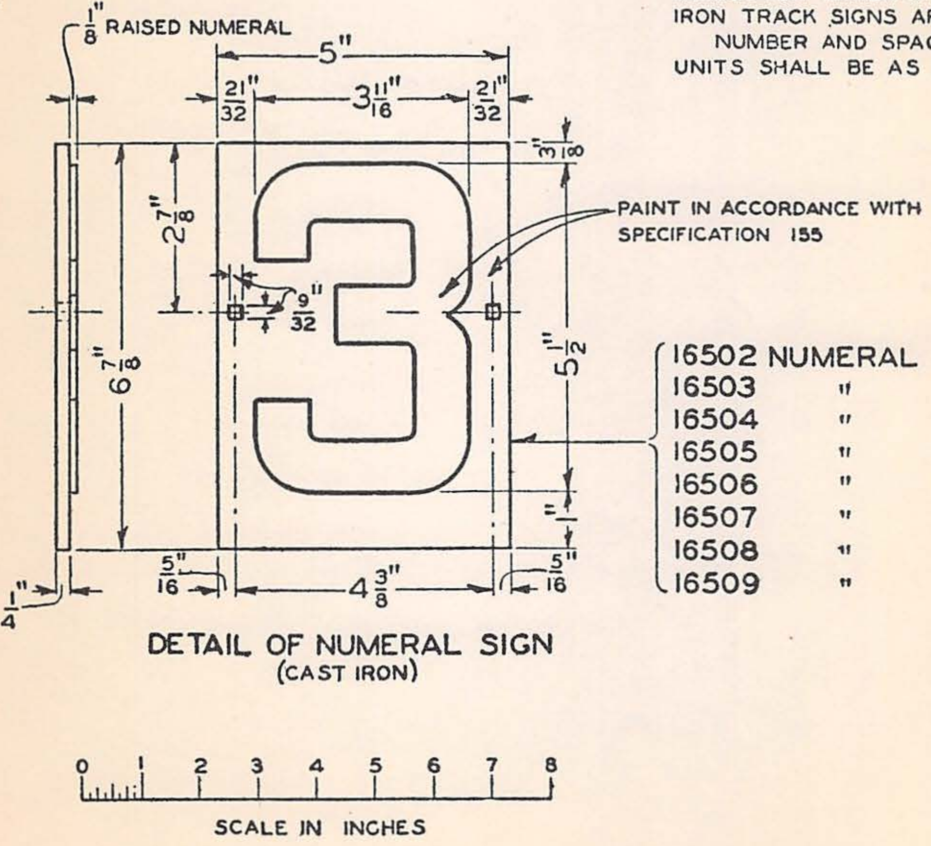

1 5/32"
15/16"
15/16"
15/16"
15/16"
5 1/2"
2 3/16"
3 11/16"
3 11/16"
3 11/16"
3 11/16"
11/32"
15/16"
15/16"
15/16"
5 1/2"
15/16"
1 3/8"

NOTE: OUTLINES OF NUMERALS FOR REFLECTOR TRACK SIGNS AND CAST-IRON TRACK SIGNS ARE IDENTICAL.
NUMBER AND SPACING OF REFLECTOR UNITS SHALL BE AS SHOWN.


1/8" RAISED NUMERAL
5"
21/32"
3 11/16"
21/32"
3/16"
2 7/8"
9/32"
PAINT IN ACCORDANCE WITH SPECIFICATION 155
6 7/8"
5 1/2"
1"
5/16"
4 3/8"
5/16"
1/4"
0 1 2 3 4 5 6 7 8
SCALE IN INCHES

DETAIL OF NUMERAL SIGN
(CAST IRON)

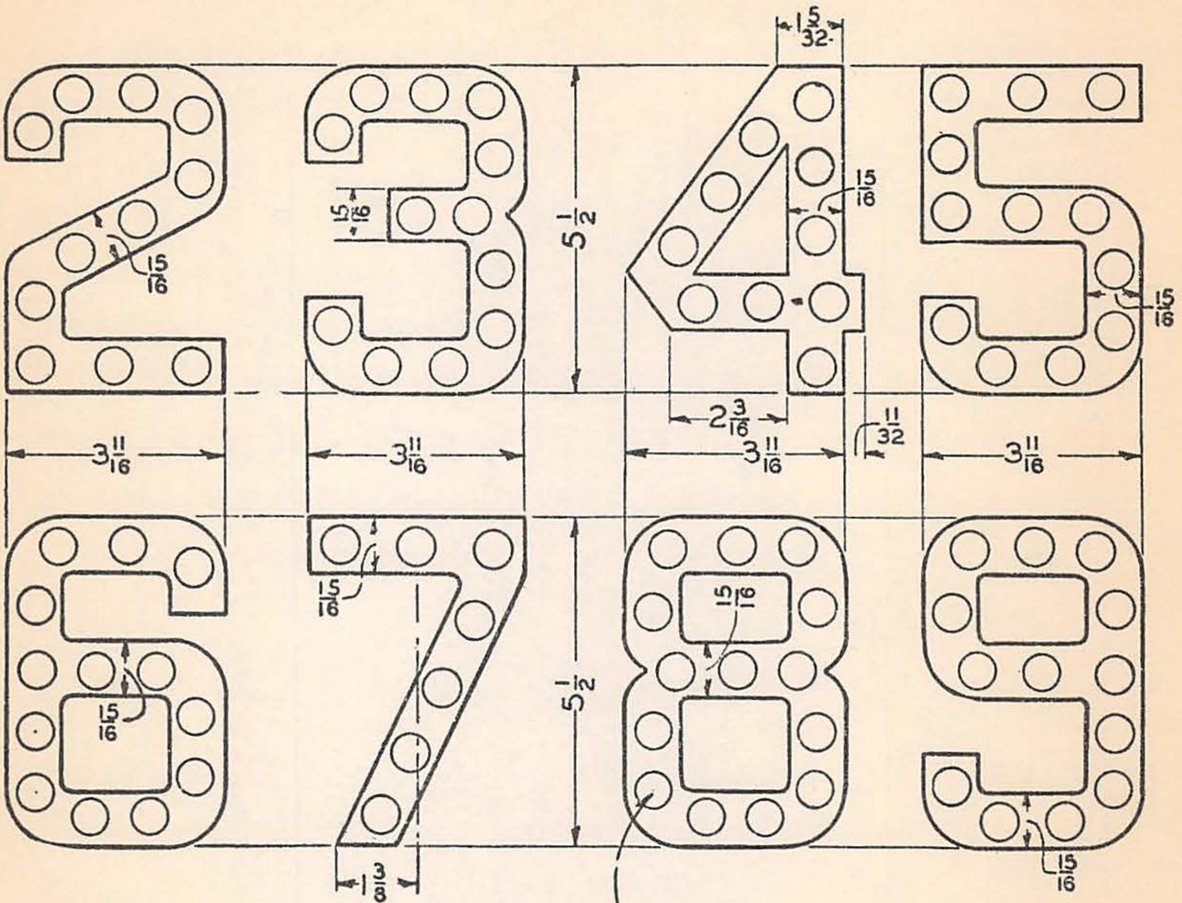
16502 NUMERAL SIGN WITH FIGURE 2
16503 " " " " 3
16504 " " " " 4
16505 " " " " 5
16506 " " " " 6
16507 " " " " 7
16508 " " " " 8
16509 " " " " 9

DETAILS OF NUMERALS FOR TRACK SIGNS

AAR
SIG.SEC.
1650B

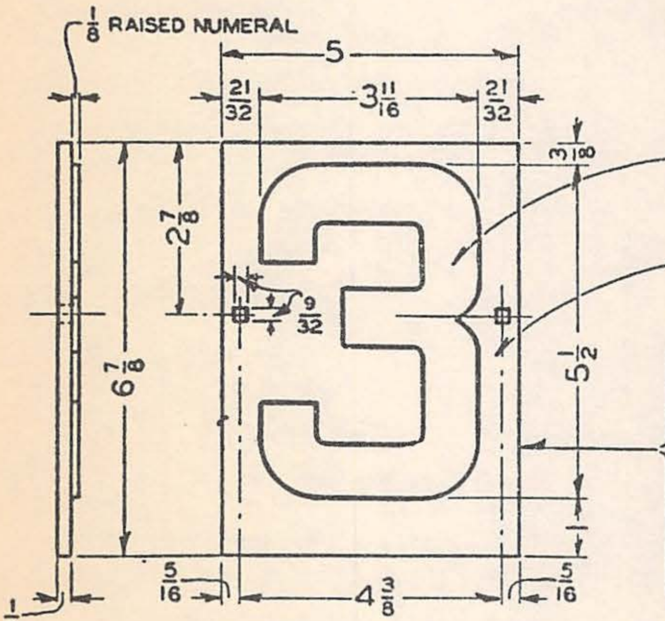
M-1937	MAR 1937	M-1933	MAY 1933

Material shall be in accordance with Specifications 120, 155 and Specification for Gray Iron Castings.



1 5/32
15/16
15/16
15/16
15/16
5 1/2
2 3/16
11/32
3 11/16
3 11/16
3 11/16
3 11/16
15/16
15/16
15/16
5 1/2
15/16
1 3/8

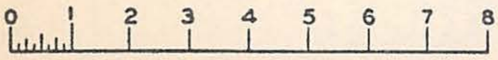
OUTLINES OF NUMERALS FOR REFLECTOR AND CAST IRON SIGNS ARE IDENTICAL. NUMBER AND SPACING OF HOLES FOR REFLECTOR UNITS SHALL BE AS SHOWN.



1/8 RAISED NUMERAL
5
21/32
3 11/16
21/32
3/8
2 7/8
9/32
6 7/8
5 1/2
1
5/16
4 3/8
5/16
1/4
BLACK
WHITE

DETAIL OF NUMERAL SIGN
CAST IRON

16502	NUMERAL	SIGN	WITH	FIGURE	2
16503	"	"	"	"	3
16504	"	"	"	"	4
16505	"	"	"	"	5
16506	"	"	"	"	6
16507	"	"	"	"	7
16508	"	"	"	"	8
16509	"	"	"		9



SCALE AND ALL DIMENSIONS GIVEN IN INCHES

DETAILS OF NUMERALS FOR TRACK SIGNS

AAR
SIG.SEC.
1650C

M-1947	SEP. 1947	M-1937	MAR 1937	M-1933	MAY 1933

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Painting shall be in accordance with Specification 155, Manual Part 44.

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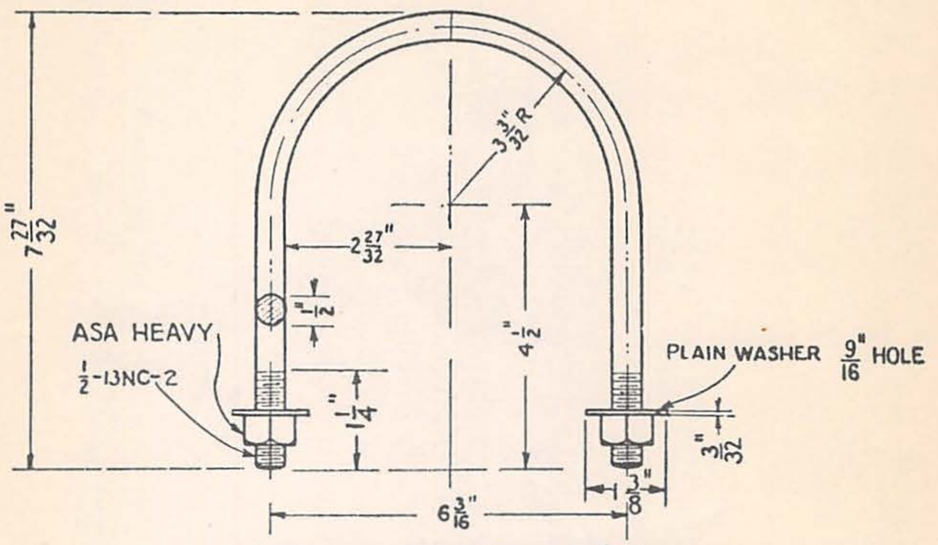
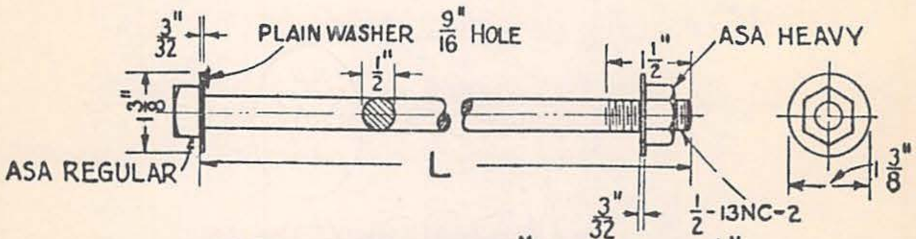

7 27/32"
3 3/32" R
2 27/32"
1/2"
4 1/2"
ASA HEAVY
1/2-13NC-2
1 1/4"
PLAIN WASHER 9/16" HOLE
3/32"
1 3/8"
6 3/16"

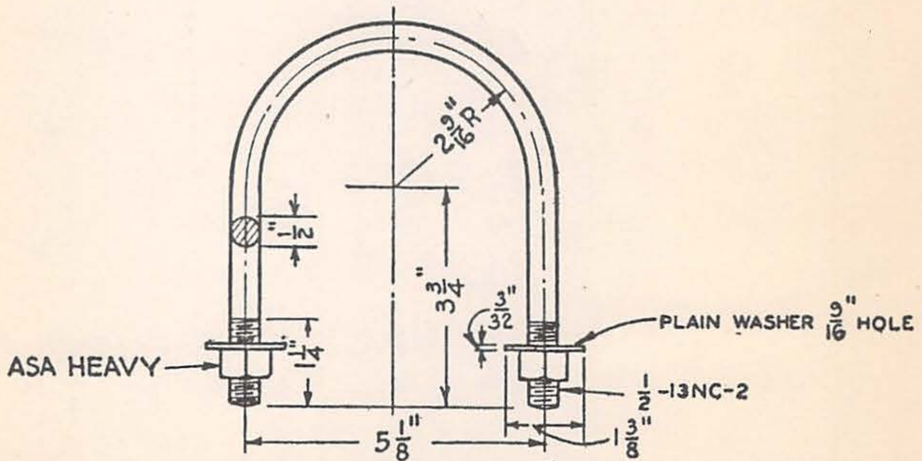
16551 U- BOLT FOR 5" PIPE

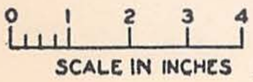
O. H. STEEL


3/32"
PLAIN WASHER 9/16" HOLE
1/2"
1 3/8"
ASA REGULAR
L
1 1/2"
ASA HEAVY
1 3/8"
3/32"
1/2-13NC-2

16552 BOLT FOR 5" PIPE, L = 8 1/2"
16553 " " 4" " L = 7"

O. H. STEEL


2 9/16" R
1/2"
3 3/4"
3/32"
PLAIN WASHER 9/16" HOLE
ASA HEAVY
1 1/4"
1/2-13NC-2
5 1/8"
1 3/8"


0 1 2 3 4
SCALE IN INCHES

16554 U-BOLT FOR 4" PIPE

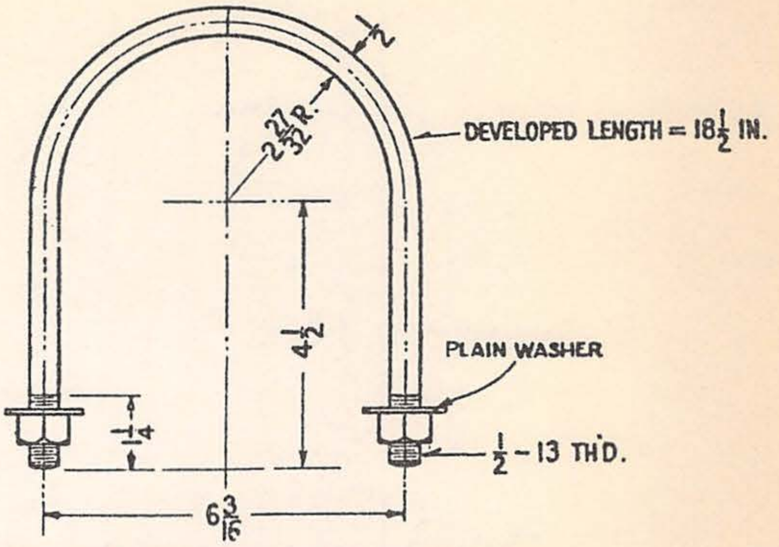
O. H. STEEL

BOLTS FOR CROSSING SIGNS
FOR 4" OR 5" PIPE

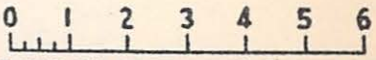
AAR
SIG. SEC.
1655B

M-1937 MAR.1937 M-1935 MAR1935

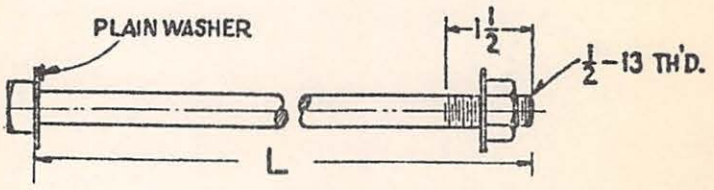
Painting shall be in accordance with Specification 120.


$\frac{1}{2}$
$2\frac{27}{32}$ R.
DEVELOPED LENGTH = $18\frac{1}{2}$ IN.
$4\frac{1}{2}$
PLAIN WASHER
$1\frac{1}{4}$
$\frac{1}{2}$ - 13 TH'D.
$6\frac{3}{16}$

16551 "U" BOLT FOR 5 INCH PIPE
SAE-1020 STEEL

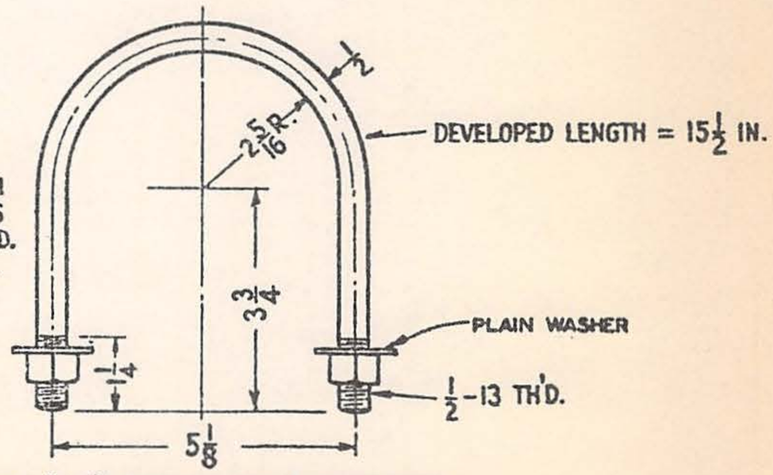


SCALE AND ALL DIMENSIONS GIVEN IN INCHES


PLAIN WASHER
$1\frac{1}{2}$
$\frac{1}{2}$ - 13 TH'D.
L

16552 BOLT FOR 5 INCH PIPE L = $8\frac{1}{2}$ IN.
16553 " " 4 " " L = 7 IN.

NOTE:
FORMED BOLTS SHALL BE PAINTED WITH PRIMING COAT OR GALVANIZED OR CADMIUM PLATED. STRAIGHT BOLT, NUTS AND WASHERS SHALL BE GALVANIZED OR CADMIUM PLATED. GALVANIZING OR CADMIUM PLATING SHALL BE DONE AFTER THREADS HAVE BEEN CUT AND BOLTS FORMED.


$\frac{1}{2}$
$2\frac{5}{16}$ R.
DEVELOPED LENGTH = $15\frac{1}{2}$ IN.
$3\frac{3}{4}$
PLAIN WASHER
$1\frac{1}{4}$
$\frac{1}{2}$ - 13 TH'D.
$5\frac{1}{8}$

16554 "U" BOLT FOR 4 INCH PIPE
SAE-1020 STEEL

BOLTS FOR CROSSING SIGNS

FOR 4 OR 5 INCH PIPE

AAR
SIG. SEC.
1655C

						M-1947	SEP. 1947	M-1937	MAR. 1937	M-1935	MAR 1935

Painting shall be in accordance with Specification 120, Manual Part 110; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17.

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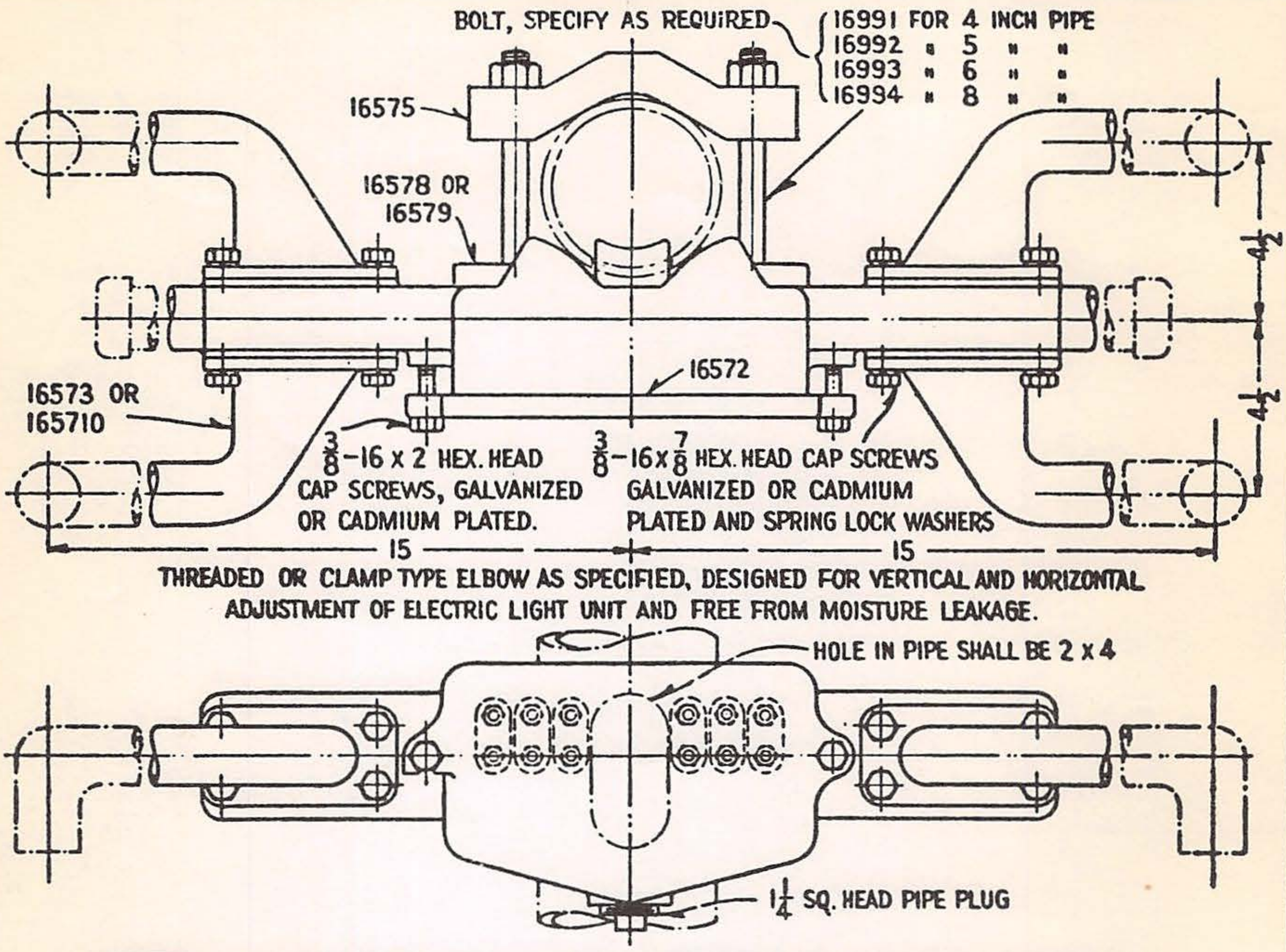
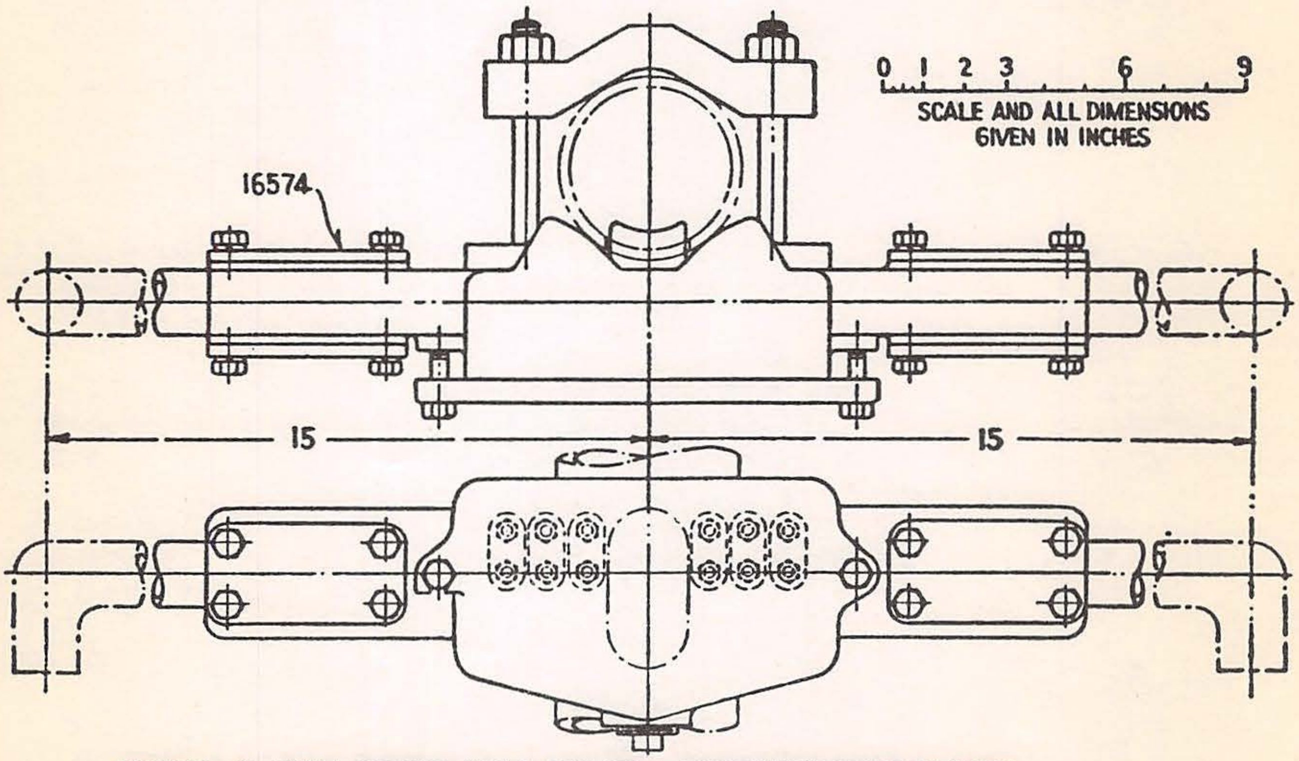

BOLT, SPECIFY AS REQUIRED
16991 FOR 4 INCH PIPE
16992 " 5 " "
16993 " 6 " "
16994 " 8 " "
16575
16578 OR
16579
16572
16573 OR
165710
$\frac{3}{8}$-16 x 2 HEX. HEAD CAP SCREWS, GALVANIZED OR CADMIUM PLATED.
$\frac{3}{8}$-16 x $\frac{7}{8}$ HEX. HEAD CAP SCREWS GALVANIZED OR CADMIUM PLATED AND SPRING LOCK WASHERS
$4\frac{1}{2}$
$4\frac{1}{2}$
15
15
THREADED OR CLAMP TYPE ELBOW AS SPECIFIED, DESIGNED FOR VERTICAL AND HORIZONTAL ADJUSTMENT OF ELECTRIC LIGHT UNIT AND FREE FROM MOISTURE LEAKAGE.
HOLE IN PIPE SHALL BE 2 x 4
$1\frac{1}{4}$ SQ. HEAD PIPE PLUG

16565 4 WAY CROSS-ARM COMPL., THREADED TYPE ELBOW AND CAP
16566 " " " " " CLAMP TYPE " " "


0 1 2 3 6 9
SCALE AND ALL DIMENSIONS GIVEN IN INCHES
16574
15
15

16567 2 WAY CROSS-ARM COMPL., THREADED TYPE ELBOW
16568 " " " " " CLAMP TYPE "

CROSS-ARMS

FOR FLASHING LIGHT HIGHWAY CROSSING SIGNALS WITHOUT GATES – 4 TO 8 INCH PIPE – ASSEMBLIES

					M-1949	SEP. 1949	M-1947	SEP. 1947	M-1936	MAR. 1936	MAR. 1935

AAR
SIG. SEC.
1656D

Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17. Spring lock washers shall be carbon steel (A.S.A. current Specification B27.1 is preferred where practicable).

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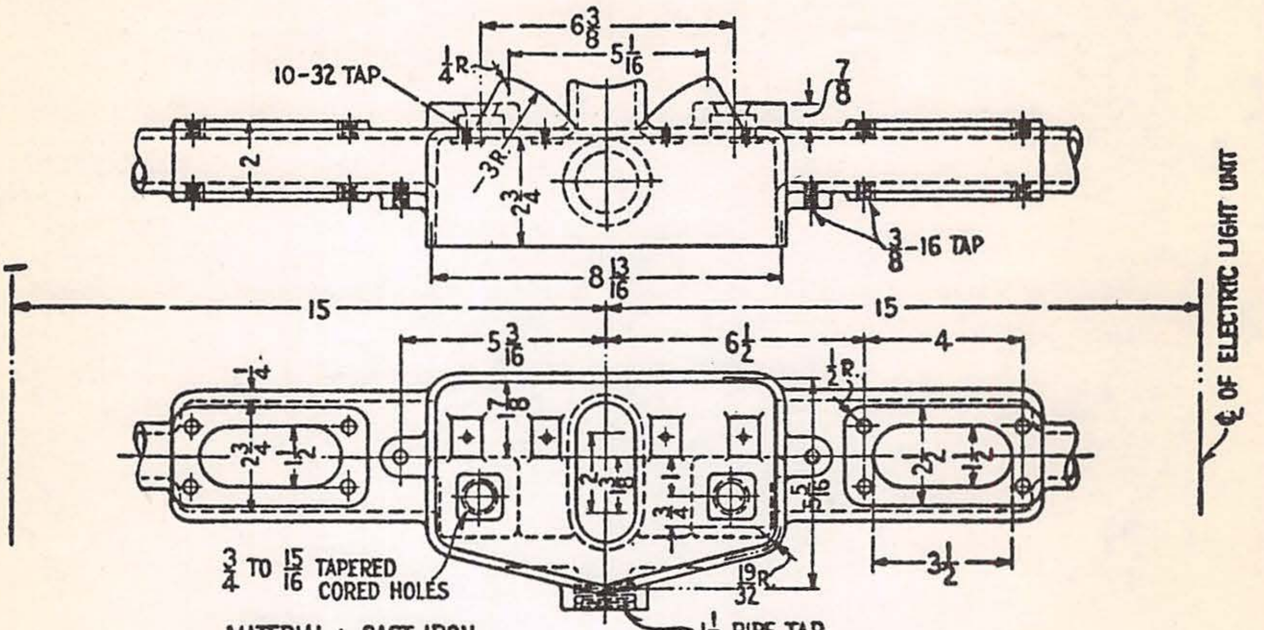
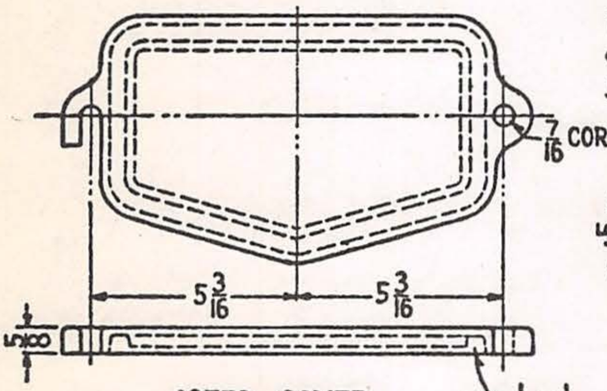
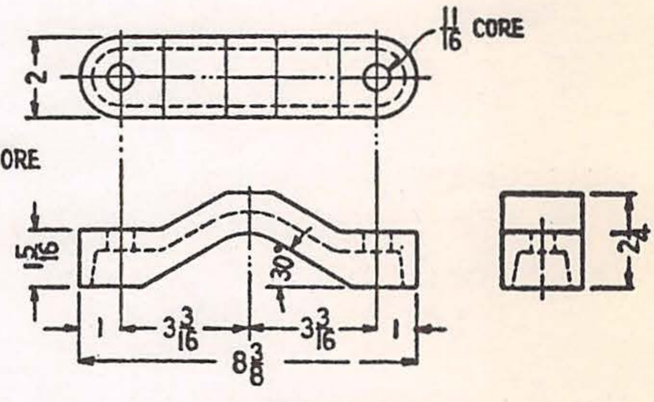

6 3/8
5 1/16
1/4 R.
10-32 TAP
7/8
2
3R.
2 1/4
3/8-16 TAP
8 13/16
15
15
℄ OF ELECTRIC LIGHT UNIT
5 3/16
6 1/2
4
1/4
1/2 R.
2 1/4
1 1/2
1 7/8
2 3/8
1 1/8
1 3/4
1 5/16
2 1/2
1 1/2
3 1/2
3/4 TO 15/16 TAPERED CORED HOLES
19/32 R.
1 1/4 PIPE TAP

MATERIAL : CAST IRON

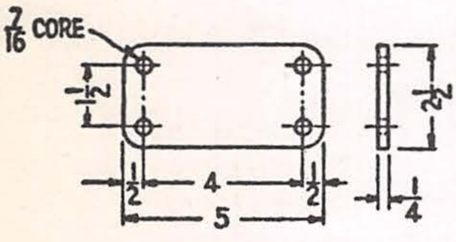
16578 CROSS-ARM ONLY, THREADED TYPE
16579 " " " CLAMP TYPE


7/16 CORE
5 3/16
5 3/16
5/16
FOR 1/2 x 1/4 FELT GASKET

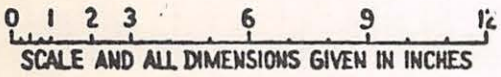
16572 COVER
CAST IRON

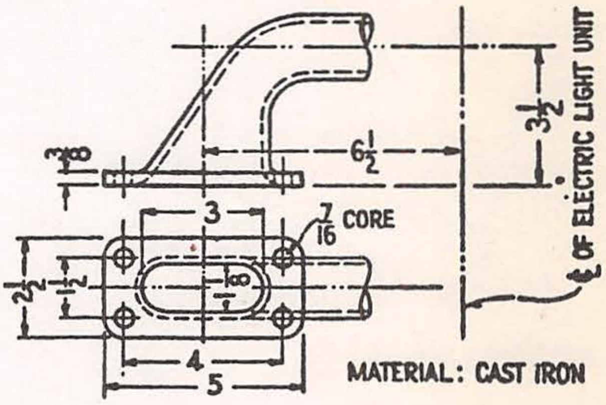

11/16 CORE
2
1 5/16
30°
1
3 3/16
3 3/16
1
8 3/8
2 1/4

16575 SADDLE
CAST IRON


7/16 CORE
1 1/2
2 1/2
1/2
4
1/2
5
1/4

16574 COVER
CAST IRON


0 1 2 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES


3/8
6 1/2
3 1/2
℄ OF ELECTRIC LIGHT UNIT
3
7/16 CORE
2 1/2
1 1/2
1 1/8
4
5

MATERIAL: CAST IRON

16573 BRACKET, THREADED TYPE
165710 " CLAMP TYPE

CROSS-ARMS

FOR FLASHING LIGHT HIGHWAY CROSSING SIGNALS – 4 TO 8 INCH PIPE – DETAILS

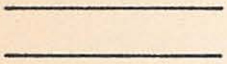
AAR
SIG.SEC.
1657D

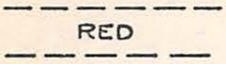
					M-1949	SEP. 1949	M-1947	SEP. 1947	M-1936	MAR. 1936	MAR. 1935

Cast iron shall be in accordance with Specification for Gray Iron Castings, Manual Part 88; Bolts, nuts and threads shall be in accordance with Specification for Bolts, Nuts and Threads, Manual Part 17; Spring lock washers shall be carbon steel (A.S.A. current Specification B27.1 is preferred where practicable); Painting shall be in accordance with Specification 120, Manual Part 110.

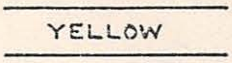
RAILWAY TRACKS

SIGNIFY STEAM OR ELECTRIC WHERE ELECTRIC TRACKS CROSS OR JOIN STEAM TRACKS

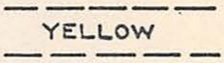

RAILWAY TRACK TO REMAIN



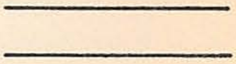
TRACK TO BE TAKEN UP



PROPOSED TRACKS

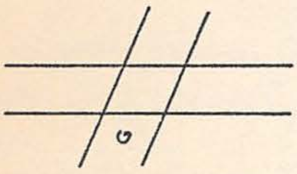


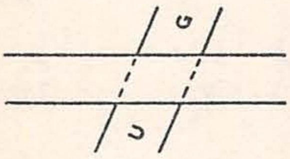
PROPOSED (FUTURE) TRACKS

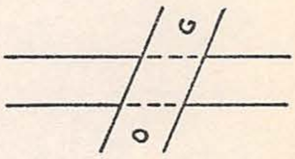

FOREIGN TRACKS (TO BE INDICATED BY NAME)

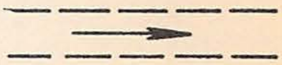
NOTE: WHERE OTHER COLORS ARE USED, EXPLANATION OF COLOR IS TO BE SHOWN ON PLAN.

HIGHWAY CROSSINGS


GRADE CROSSING

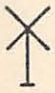

UNDERGRADE CROSSING

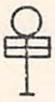

OVERGRADE CROSSING

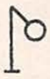

TRAFFIC DIRECTION

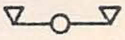
NOTE: NAME TO BE PROVIDED AS NECESSARY. STREET NAME OR NUMBER, HIGHWAY NAME OR ROUTE NO., FARM OR PRIVATE CROSSING. SINGLE LINE REPRESENTING TRACK MAY BE USED AS DESIRED.

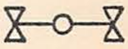
HIGHWAY CROSSING SIGNALS


CROSSING SIGN

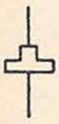

BELL


WIG-WAG

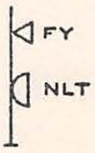

ONE WAY


BOTH WAYS

FLASHING LIGHTS

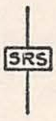

NUMBER OF TRACKS SIGN MOUNTED ON SIGNAL POST

NUMBER OF TRACKS TO BE SHOWN ON PLAN OR COVERED BY NOTE (SEE 1691)

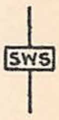


FLASHING LIGHT AND NO TURN SIGNS

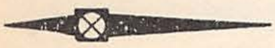
FY: FLASHING YELLOW
NLT: NO LEFT TURN
NRT: NO RIGHT TURN

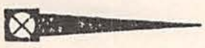


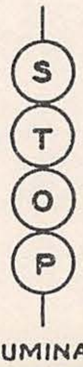
STOP ON RED SIGNAL SIGN



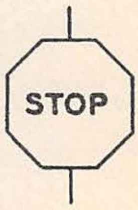
STOP WHEN SWINGING SIGN


CROSSING GATE WITH SIDEWALK ARM

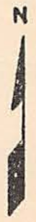

CROSSING GATE WITHOUT SIDEWALK ARM



ILLUMINATED STOP SIGN



ROTATING DISC.



MERIDIAN

NOTE: COMBINATION OF ABOVE SYMBOLS MAY BE USED AS REQUIRED.

GRAPHICAL SYMBOLS
TRACKS AND HIGHWAY CROSSINGS

M-1947 SEPT.1947 M-1944 OCT.1944 M-1934 MAR.1934

AAR
SIG. SEC.
1662C

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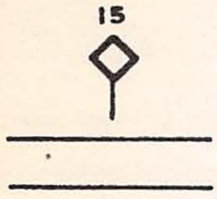
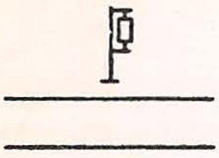
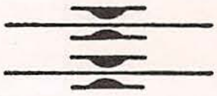


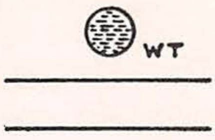
MILE POST



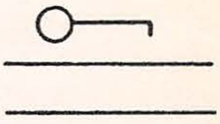
MAIL CRANE



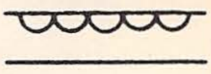
DRAGGING EQUIPMENT DETECTOR



WATER TANK

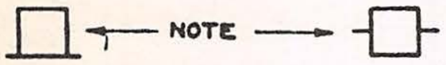


WATER COLUMN
OIL COLUMN
GAS COLUMN
(LETTER IN CIRCLE TO DESIGNATE KIND OF COLUMN)



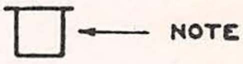
TRACK PAN

HOUSINGS

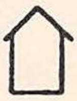


ABOVE SURFACE

HALF ABOVE SURFACE

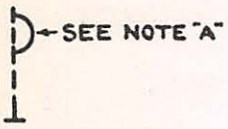


BELOW SURFACE



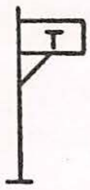
INSTRUMENT HOUSE

NOTE: USE "T" FOR TELEPHONE
"I" FOR INSTRUMENT BOX
"J" FOR JUNCTION BOX
"M" FOR MANHOLE
"L" FOR LIGHTNING ARRESTER BOX
"R" FOR RELAY BOX
"$\frac{B}{4}$" FOR BATTERY BOX AND CAPACITY

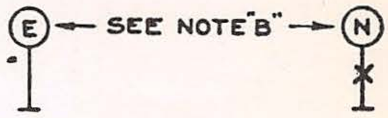


INDICATOR

NOTE: A
USE "S" TAKE OR LEAVE SIDING.
"DE" DRAGGING EQUIPMENT.



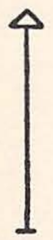
TRAIN INDICATOR



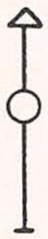
SWITCH INDICATOR

SWITCH INDICATOR AND SWITCH CIRCUIT CONTROLLER

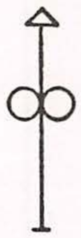
NOTE: B
TYPE OF INDICATOR TO BE COVERED BY GENERAL NOTE. LETTER E, W, N OR S INDICATES TRACK CONTROLLING INDICATOR.



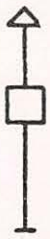
CABLE POST ONLY



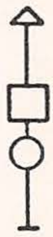
WITH ONE INDICATOR



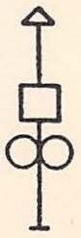
WITH TWO INDICATORS



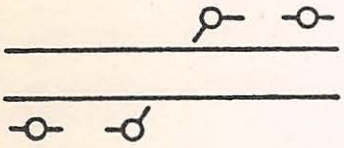
WITH RELAY BOX



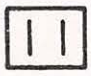
WITH RELAY BOX AND ONE INDICATOR



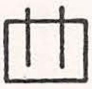
WITH RELAY BOX AND TWO INDICATORS



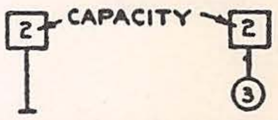
POLE LINE



GROUND LEVERS

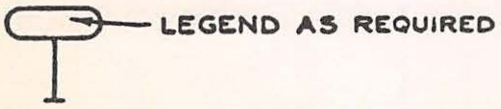


DWARF MACHINE



RELAY BOX AND POST

BATTERY CHUTE, RELAY BOX AND POST COMBINED



ROADWAY SIGNS

GRAPHICAL SYMBOLS
WAYSIDE FIXTURES

AAR
SIG. SEC.
1664C

					M-1949	SEPT-1949	M-1944	OCT. 1944	M-1934	MAR. 1934

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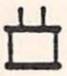
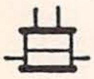
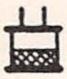
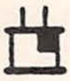
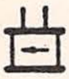
DIRECT CURRENT RELAYS


SINGLE WINDING

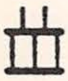

DOUBLE WINDING
SPECIFY RESISTANCE OF COILS

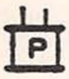

RETAINED

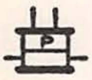

MAGNETIC STICK

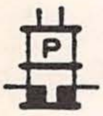

BIASED

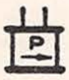
NEUTRAL

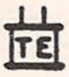

3 POSITION

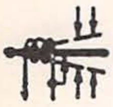

POLARIZED

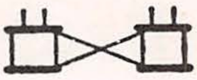

POLARIZED DOUBLE WOUND

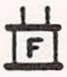

POLARIZED MAGNETIC STICK

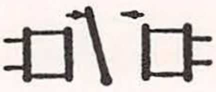

POLAR BIASED
ARROW DENOTES DIRECTION OF BIAS

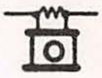

TIME ELEMENT

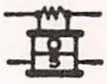

TUNED ALTERNATOR

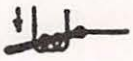

INTERLOCKING


FLASHER


DOUBLE ACTING


OVERLOAD


OVERLOAD DOUBLE WINDING


THERMAL

NOTE:

ABOVE SYMBOLS MAY BE COMBINED AS REQUIRED.

SYMBOLS AS SHOWN ARE FOR RELAYS DESIGNED FOR VITAL CIRCUITS.

SYMBOLS FOR RELAYS DESIGNED FOR NON-VITAL CIRCUITS TO BE SHOWN THUS NV

ALL SPECIAL FEATURES NOT COVERED BY SYMBOLS TO BE NOTED ON CIRCUIT PLANS.

GRAPHICAL SYMBOLS
RELAYS

AAR
SIG. SEC.
1673D

				M-1949	SEPT-1949	M-1948	SEPT-1948	M-1943	OCT-1943	M-1934	MAR.1934

(Sheet 1 of 3 sheets)

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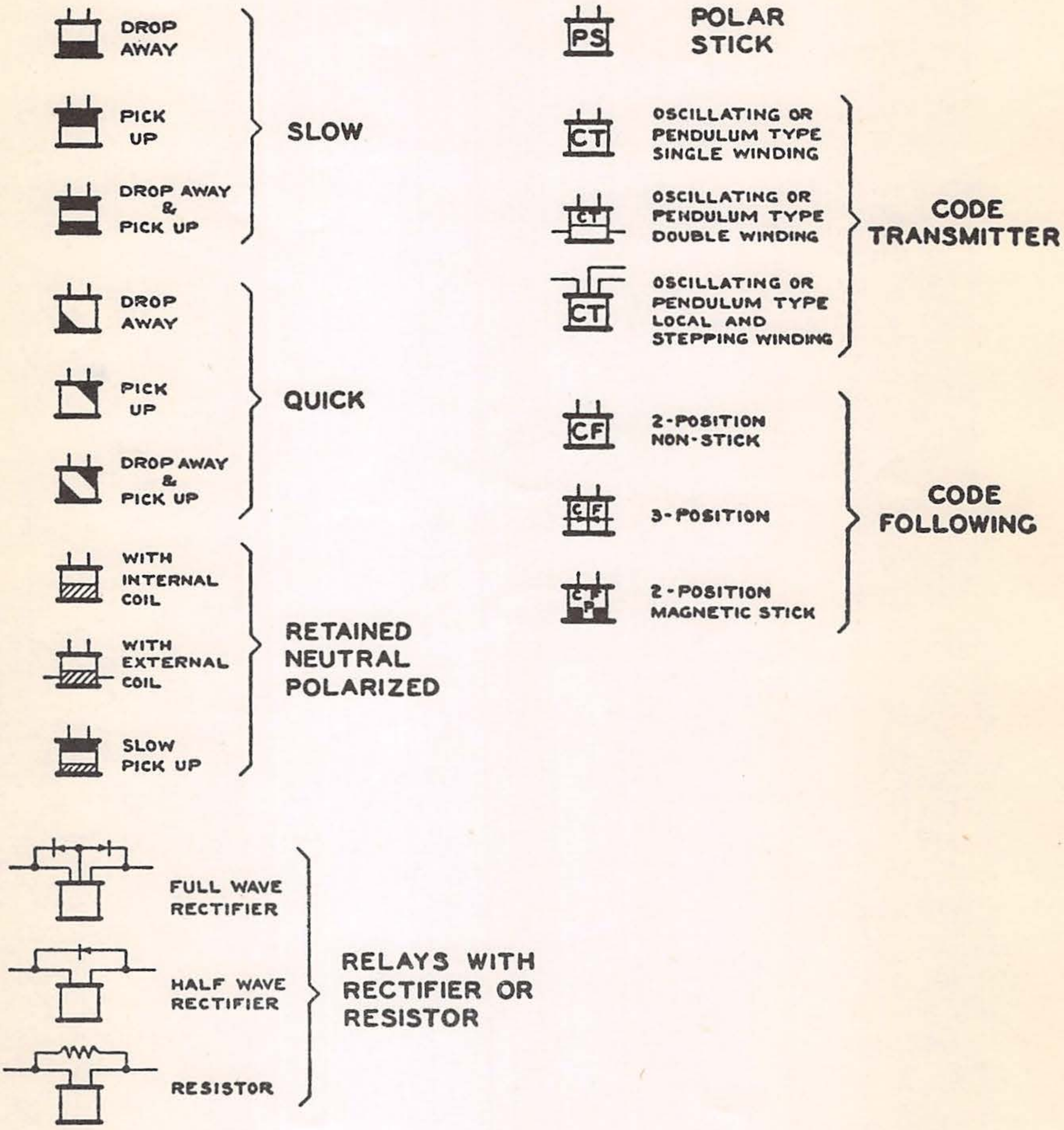
DIRECT CURRENT RELAYS


DROP AWAY
PICK UP
DROP AWAY & PICK UP
SLOW
DROP AWAY
PICK UP
DROP AWAY & PICK UP
QUICK
WITH INTERNAL COIL
WITH EXTERNAL COIL
SLOW PICK UP
RETAINED NEUTRAL POLARIZED
PS
POLAR STICK
CT
OSCILLATING OR PENDULUM TYPE SINGLE WINDING
CT
OSCILLATING OR PENDULUM TYPE DOUBLE WINDING
CT
OSCILLATING OR PENDULUM TYPE LOCAL AND STEPPING WINDING
CODE TRANSMITTER
CF
2-POSITION NON-STICK
C F
3-POSITION
C F P
2-POSITION MAGNETIC STICK
CODE FOLLOWING
FULL WAVE RECTIFIER
HALF WAVE RECTIFIER
RESISTOR
RELAYS WITH RECTIFIER OR RESISTOR

NOTE:

ABOVE SYMBOLS MAY BE COMBINED AS REQUIRED.

SYMBOLS AS SHOWN ARE FOR RELAYS DESIGNED FOR VITAL CIRCUITS.

SYMBOLS FOR RELAYS DESIGNED FOR NON-VITAL CIRCUITS TO BE SHOWN THUS $\boxed{\text{NV}}$

ALL SPECIAL FEATURES NOT COVERED BY SYMBOLS TO BE NOTED ON CIRCUIT PLANS.

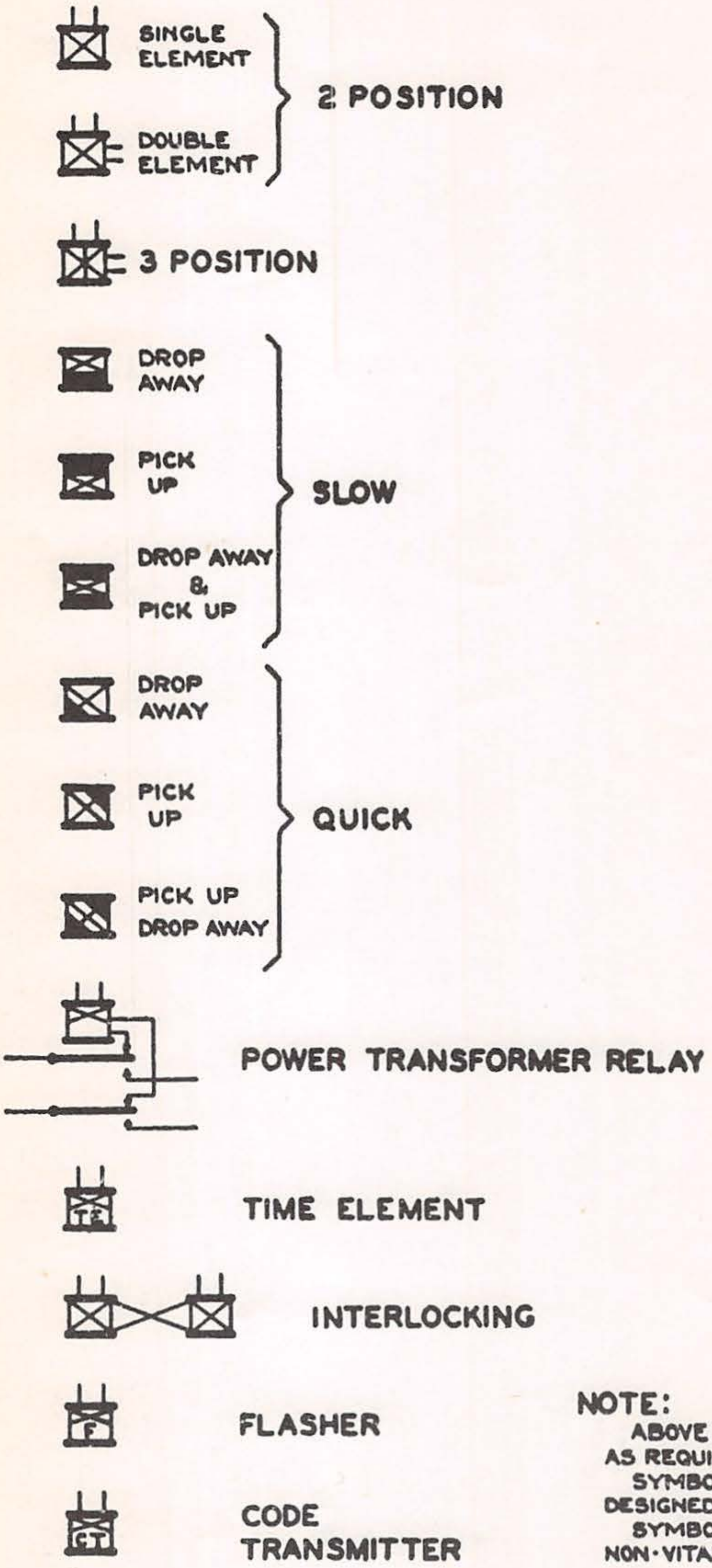
GRAPHICAL SYMBOLS
RELAYS

AAR
SIG. SEC.
1673D

M-1949 SEPT-1949 M-1948 SEPT-1948 M-1943 OCT-1943 M-1934 MAR-1934

(Sheet 2 of 3 sheets)

ALTERNATING CURRENT RELAYS


SINGLE ELEMENT
DOUBLE ELEMENT
2 POSITION
3 POSITION
DROP AWAY
PICK UP
DROP AWAY & PICK UP
SLOW
DROP AWAY
PICK UP
PICK UP DROP AWAY
QUICK
POWER TRANSFORMER RELAY
TE
TIME ELEMENT
INTERLOCKING
F
FLASHER
CT
CODE TRANSMITTER

NOTE:
ABOVE SYMBOLS MAY BE COMBINED AS REQUIRED.
SYMBOLS AS SHOWN ARE FOR RELAYS DESIGNED FOR VITAL CIRCUITS.
SYMBOLS FOR RELAYS DESIGNED FOR NON-VITAL CIRCUITS TO BE SHOWN THUS NV

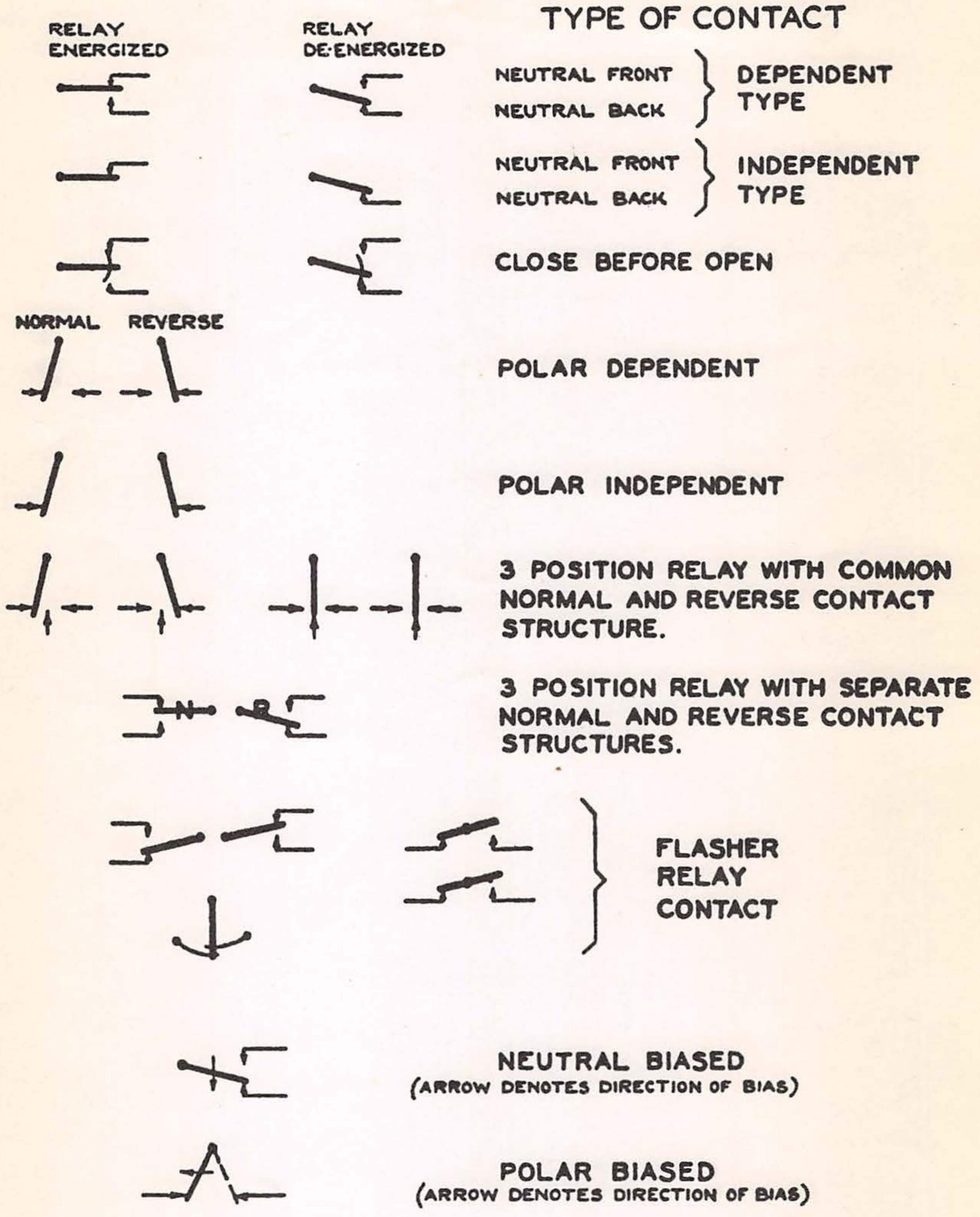
ALL SPECIAL FEATURES NOT COVERED BY SYMBOLS TO BE NOTED ON CIRCUIT PLANS.

GRAPHICAL SYMBOLS
RELAYS

AAR
SIG. SEC.
1673D

				M-1949	SEPT-1949	M-1948	SEPT-1948	M-1943	OCT-1943	M-1934	MAR-1934

(Sheet 3 of 3 sheets)


RELAY ENERGIZED
RELAY DE-ENERGIZED
TYPE OF CONTACT
NEUTRAL FRONT
NEUTRAL BACK
DEPENDENT TYPE
NEUTRAL FRONT
NEUTRAL BACK
INDEPENDENT TYPE
CLOSE BEFORE OPEN
NORMAL
REVERSE
POLAR DEPENDENT
POLAR INDEPENDENT
3 POSITION RELAY WITH COMMON NORMAL AND REVERSE CONTACT STRUCTURE.
N
R
3 POSITION RELAY WITH SEPARATE NORMAL AND REVERSE CONTACT STRUCTURES.
FLASHER RELAY CONTACT
NEUTRAL BIASED
(ARROW DENOTES DIRECTION OF BIAS)
POLAR BIASED
(ARROW DENOTES DIRECTION OF BIAS)

GRAPHICAL SYMBOLS

RELAY CONTACTS

AAR
SIG. SEC.
1674E

		M-1949	SEPT-1949	M-1948	SEPT.1948	M-1946	OCT-1946	M-1943	OCT-1943	M-1934	MAR-1934

(Sheet 1 of 3 sheets)

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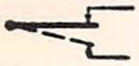
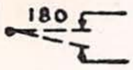
CODING CONTACTS

2 POSITION

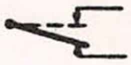
ENERGIZED



CODING



DE-ENERGIZED

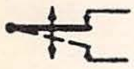


CODING CONTACT - FRONT

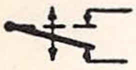
CODING CONTACT - BACK

NUMBER INDICATES CODE PER MINUTE.

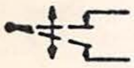
CODING



ENERGIZED OR NORMAL. STICK



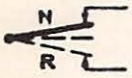
ENERGIZED OR REVERSE STICK



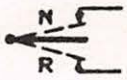
CODING

CODE FOLLOWING MAGNETIC STICK

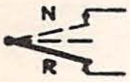
3 POSITION



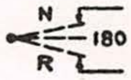
ENERGIZED NORMAL



DE-ENERGIZED



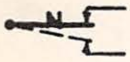
ENERGIZED REVERSE



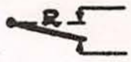
CODING

NUMBER INDICATES CODE PER MINUTE

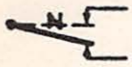
CODING



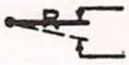
ENERGIZED NORMAL



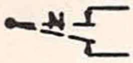
DE-ENERGIZED OR CODING NORMAL



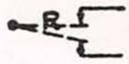
DE-ENERGIZED OR CODING REVERSE



ENERGIZED REVERSE



CODING NORMAL



CODING REVERSE

CODE FOLLOWING RELAY WITH SEPARATE NORMAL AND REVERSE CONTACT STRUCTURE TO PROVIDE THREE POSITION OPERATION.

180 DU

DECODING UNIT

NUMBER INDICATES CODE PER MINUTE TO WHICH UNIT IS TUNED.

GRAPHICAL SYMBOLS

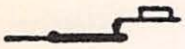
RELAY CONTACTS

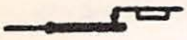
AAR
SIG. SEC.

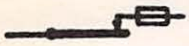
		M-1949	SEPT-1949	M-1948	SEPT-1948	M-1946	OCT-1946	M-1943	OCT-1943	M-1934	MAR-1934	1674E

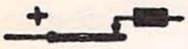
(Sheet 2 of 3 sheets)

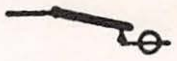
RELAY CONTACTS WITH SPECIAL CHARACTERISTICS

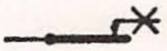

HIGH CURRENT

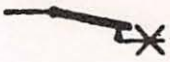

HIGH VOLTAGE


HIGH VOLTAGE AND
HIGH CURRENT


MAGNETIC BLOWOUT


CHECKING CONTACT
FOR TIME ELEMENT RELAY.


FRONT


BACK

CONTACT ON
INTERLOCKING
RELAY WHICH
REMAINS CLOSED
WITH ARMATURE
IN INTERMEDIATE
POSITION.

GRAPHICAL SYMBOLS
RELAY CONTACTS

AAR
SIG. SEC.
1674E

		M-1949	SEPT-1949	M-1948	SEPT-1948	M-1946	OCT. 1946	M-1943	OCT-1943	M-1934	MAR-1934

(Sheet 3 of 3 sheets)

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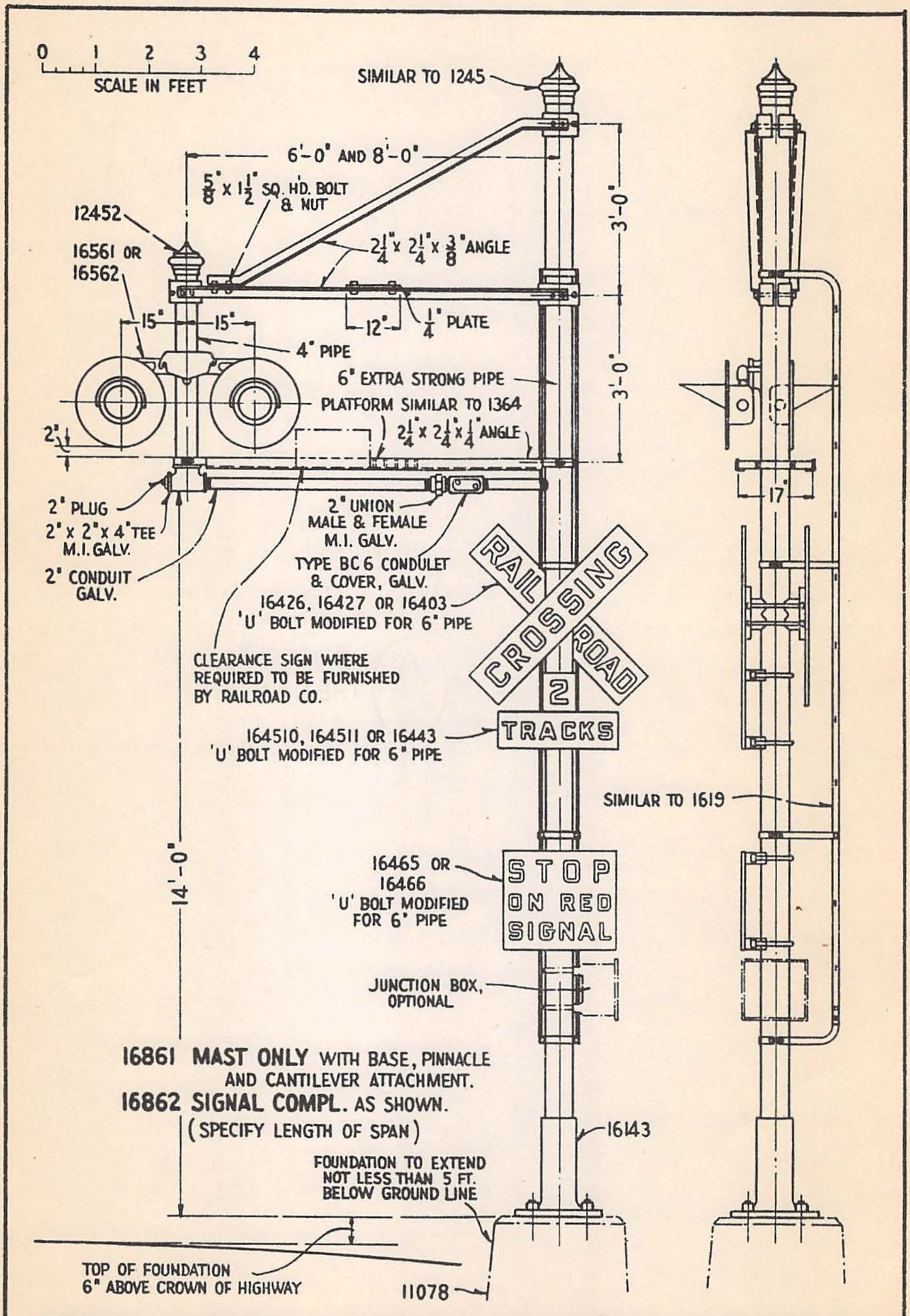

0 1 2 3 4
SCALE IN FEET
SIMILAR TO 1245
6'-0" AND 8'-0"
5/8" x 1 1/2" SQ. HD. BOLT & NUT
12452
16561 OR 16562
2 1/4" x 2 1/4" x 3/8" ANGLE
3'-0"
15"
15"
12"
1/4" PLATE
4" PIPE
6" EXTRA STRONG PIPE
3'-0"
PLATFORM SIMILAR TO 1364
2 1/4" x 2 1/4" x 1/4" ANGLE
2"
2" PLUG
2" x 2" x 4" TEE M.I. GALV.
2" CONDUIT GALV.
2" UNION MALE & FEMALE M.I. GALV.
TYPE BC 6 CONDULET & COVER, GALV.
16426, 16427 OR 16403 'U' BOLT MODIFIED FOR 6" PIPE
RAIL ROAD
CROSSING
2
TRACKS
CLEARANCE SIGN WHERE REQUIRED TO BE FURNISHED BY RAILROAD CO.
164510, 164511 OR 16443 'U' BOLT MODIFIED FOR 6" PIPE
17"
SIMILAR TO 1619
14'-0"
16465 OR 16466 'U' BOLT MODIFIED FOR 6" PIPE
STOP ON RED SIGNAL
JUNCTION BOX, OPTIONAL
16861 MAST ONLY WITH BASE, PINNACLE AND CANTILEVER ATTACHMENT.
16862 SIGNAL COMPL. AS SHOWN.
(SPECIFY LENGTH OF SPAN)
16143
FOUNDATION TO EXTEND NOT LESS THAN 5 FT. BELOW GROUND LINE
TOP OF FOUNDATION 6" ABOVE CROWN OF HIGHWAY
11078

HIGHWAY CROSSING FLASHING LIGHT SIGNAL ASSEMBLY

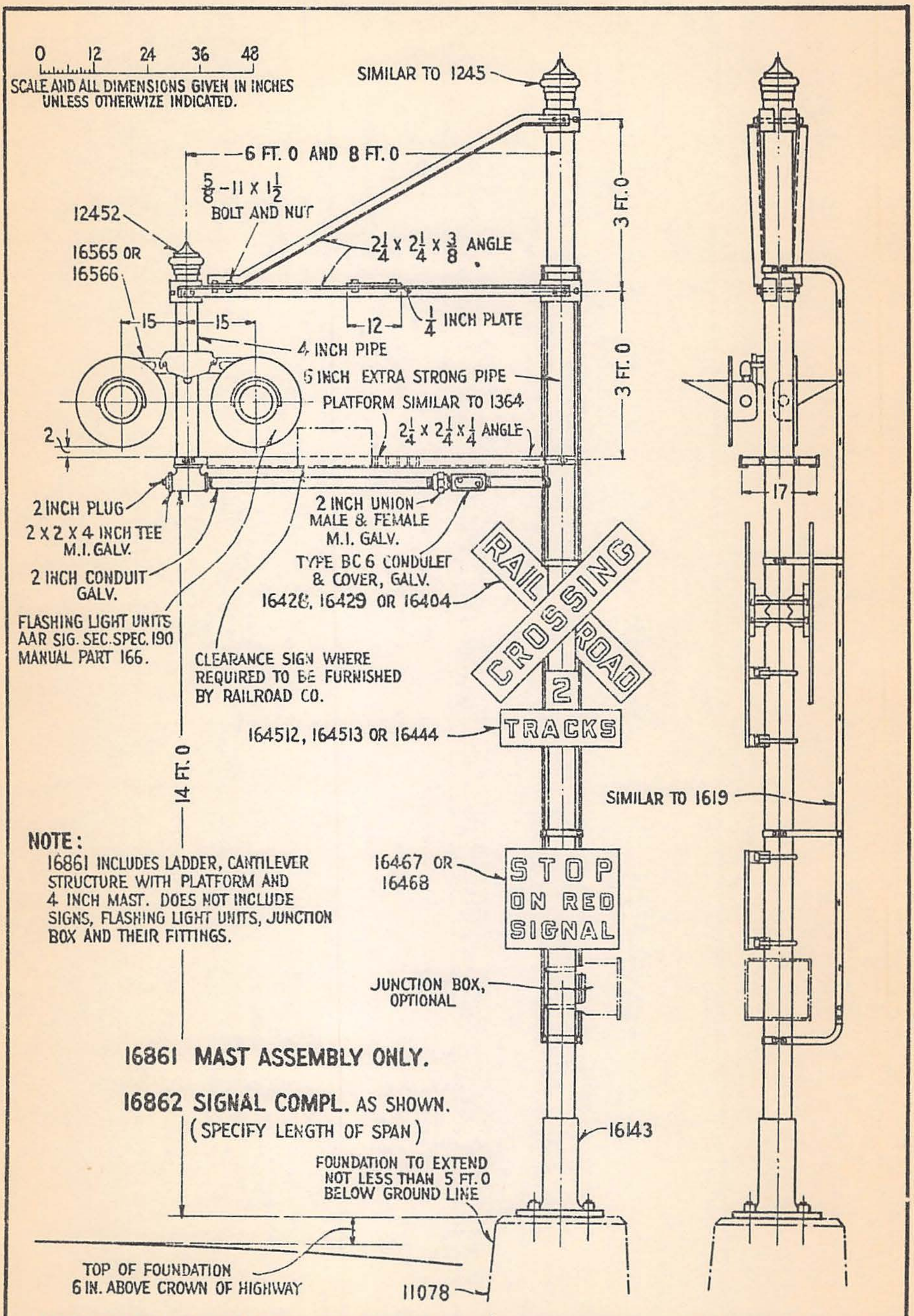
6 FT. AND 8 FT. CANTILEVER SPAN

M-1945 OCT. 1945 M-1942 OCT. 1942 M-1940 OCT. 1940 M-1937 MAR. 1937

AAR
SIG. SEC.
1686D

PRINTED IN U. S. A.

RECEIVED
FEB
12
1948
SPECIFICATION DEPT.



0 12 24 36 48
SCALE AND ALL DIMENSIONS GIVEN IN INCHES UNLESS OTHERWIZE INDICATED.
SIMILAR TO 1245
6 FT. 0 AND 8 FT. 0
$\frac{5}{8}$ - 11 x $1\frac{1}{2}$ BOLT AND NUT
12452
16565 OR 16566
$2\frac{1}{4}$ x $2\frac{1}{4}$ x $\frac{3}{8}$ ANGLE
3 FT. 0
15
15
12
$\frac{1}{4}$ INCH PLATE
4 INCH PIPE
5 INCH EXTRA STRONG PIPE
PLATFORM SIMILAR TO 1364
$2\frac{1}{4}$ x $2\frac{1}{4}$ x $\frac{1}{4}$ ANGLE
3 FT. 0
2
17
2 INCH PLUG
2 X 2 X 4 INCH TEE M.I. GALV.
2 INCH CONDUIT GALV.
2 INCH UNION MALE & FEMALE M.I. GALV.
TYPE BC 6 CONDULET & COVER, GALV.
16428, 16429 OR 16404
RAIL ROAD CROSSING
2
TRACKS
FLASHING LIGHT UNITS AAR SIG. SEC. SPEC. 190 MANUAL PART 166.
CLEARANCE SIGN WHERE REQUIRED TO BE FURNISHED BY RAILROAD CO.
164512, 164513 OR 16444
14 FT. 0
SIMILAR TO 1619
16467 OR 16468
STOP ON RED SIGNAL
JUNCTION BOX, OPTIONAL
16143
FOUNDATION TO EXTEND NOT LESS THAN 5 FT. 0 BELOW GROUND LINE
TOP OF FOUNDATION 6 IN. ABOVE CROWN OF HIGHWAY
11078

NOTE:
16861 INCLUDES LADDER, CANTILEVER STRUCTURE WITH PLATFORM AND 4 INCH MAST. DOES NOT INCLUDE SIGNS, FLASHING LIGHT UNITS, JUNCTION BOX AND THEIR FITTINGS.

16861 MAST ASSEMBLY ONLY.

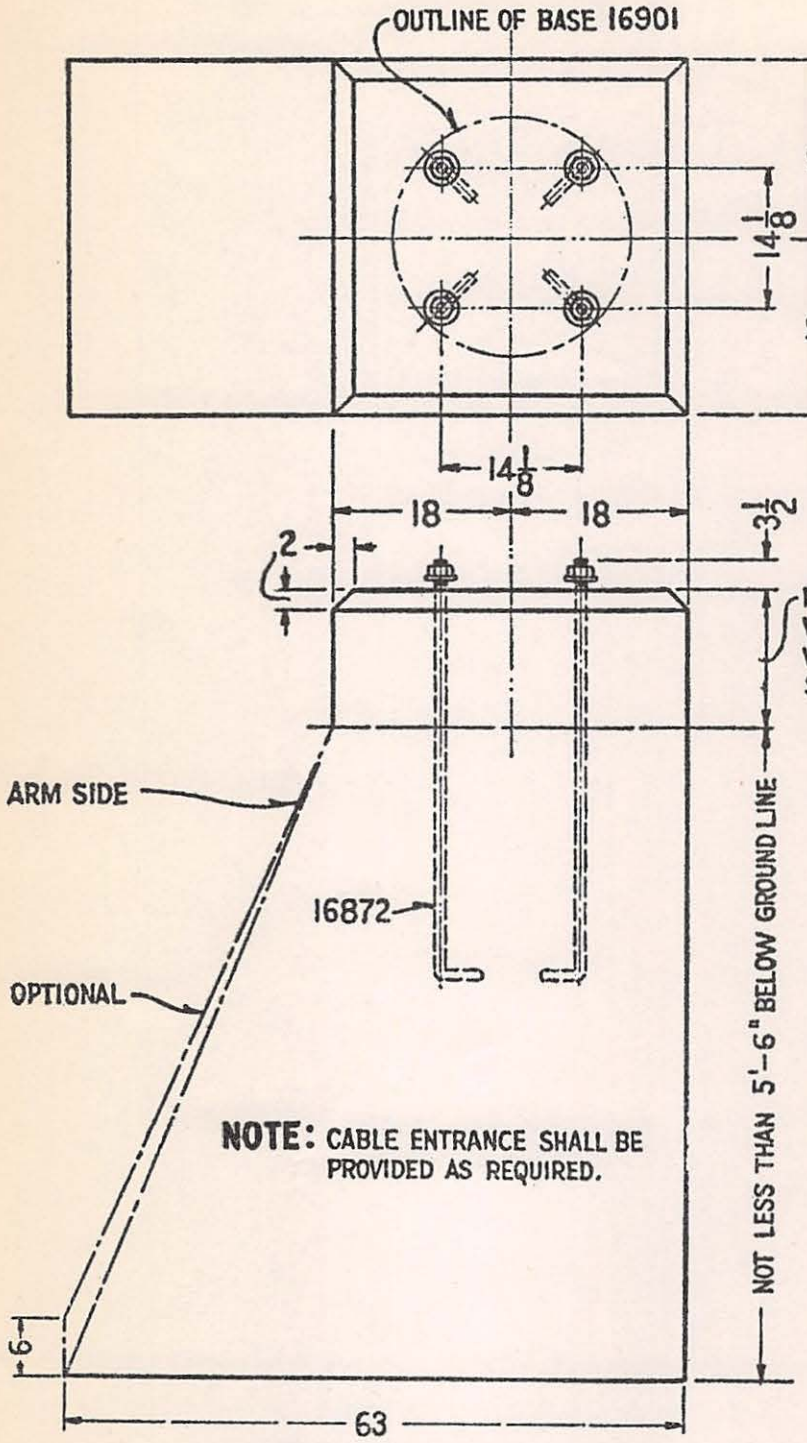
16862 SIGNAL COMPL. AS SHOWN.
(SPECIFY LENGTH OF SPAN)

HIGHWAY CROSSING FLASHING LIGHT SIGNAL ASSEMBLY

6 FT. AND 8 FT. CANTILEVER SPAN

		M-1947	SEP. 1947	M-1945	OCT. 1945	M-1942	OCT. 1942	M-1940	OCT. 1940	M-1937	MAR. 1937

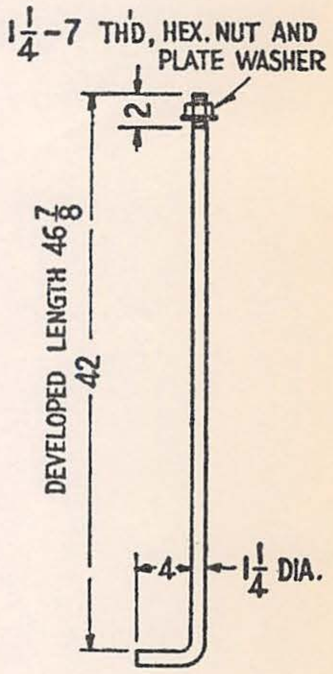
AAR
SIG. SEC.
1686E


OUTLINE OF BASE 16901
18
$14\frac{1}{8}$
18
$14\frac{1}{8}$
18
18
$3\frac{1}{2}$
2
1
NOT MORE THAN 24 IN., WHERE MORE THAN 12 IN. VERTICAL REINFORCEMENT SHALL BE USED.
ARM SIDE
16872
OPTIONAL
NOT LESS THAN 5'-6" BELOW GROUND LINE
6
63

NOTE: CABLE ENTRANCE SHALL BE PROVIDED AS REQUIRED.

0 12 24
0 12 24
SCALES & ALL DIMENSIONS GIVEN IN INCHES

16871 ASSEMBLY


$1\frac{1}{4}$-7 TH'D, HEX. NUT AND PLATE WASHER
2
DEVELOPED LENGTH $46\frac{7}{8}$
42
4
$1\frac{1}{4}$ DIA.

16872 ANCHOR BOLT

SAE-1020 STEEL GALVANIZED OR CADMIUM PLATED AFTER THREADS HAVE BEEN CUT.

CONCRETE:

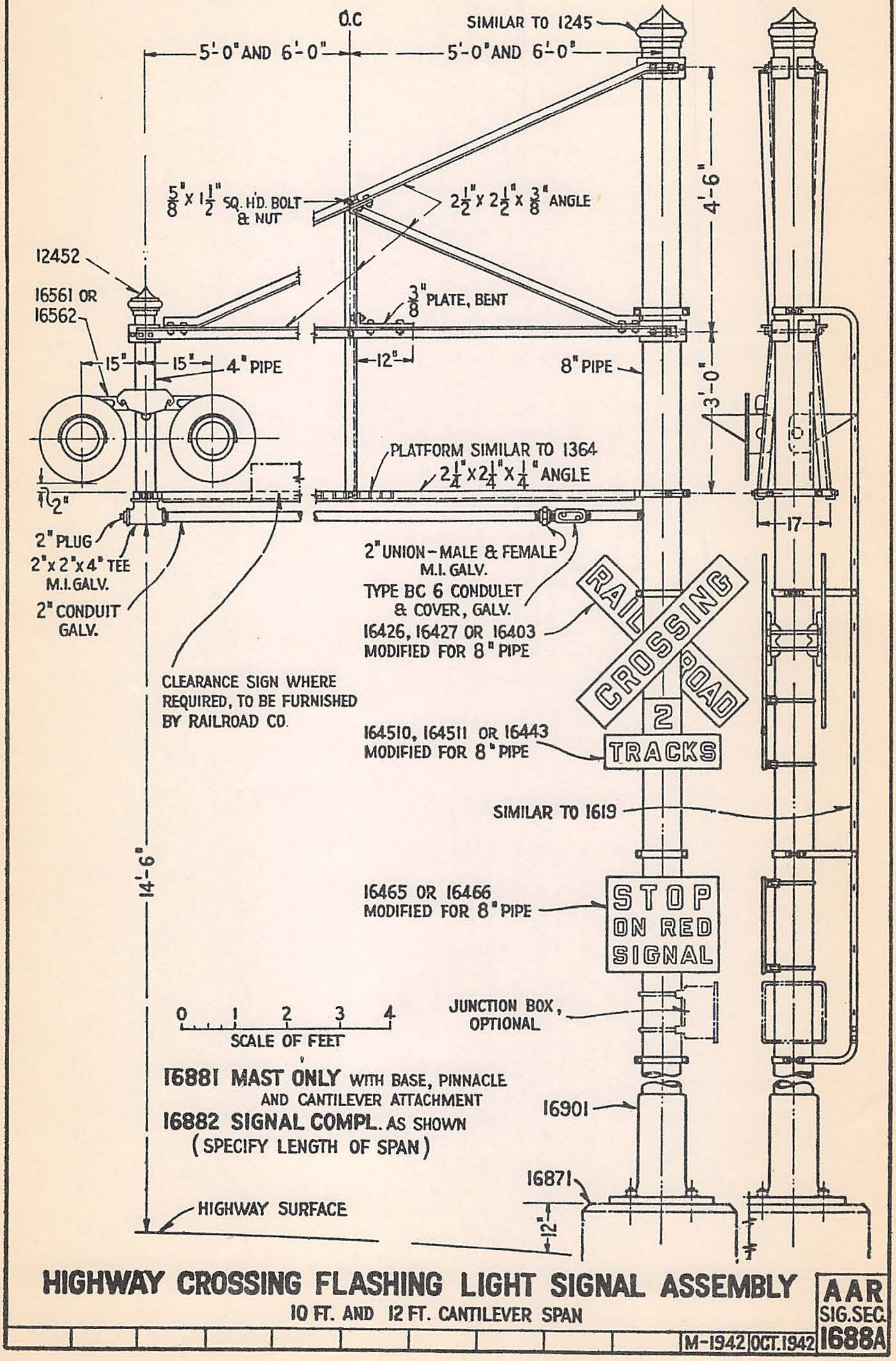
FOUNDATION SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.
COARSE AGGREGATE SHALL CONSIST OF 3/4 INCH MAXIMUM SIZE STONE OR GRAVEL.
NOT LESS THAN 6 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.
WATER CONTENT PER 94 LB. SACK OF CEMENT SHALL NOT EXCEED 7 GALLONS.
COMPRESSIVE STRENGTH AFTER 28 DAYS SHALL NOT BE LESS THAN 3000 LBS. PER SQUARE INCH.

HIGHWAY CROSSING SIGNAL FOUNDATION

CANTILEVER MAST

M-1942 OCT.1942

AAR
SIG.SEC.
1687A


O.C
SIMILAR TO 1245
5'-0" AND 6'-0"
5'-0" AND 6'-0"
$\frac{5}{8}$" x $1\frac{1}{2}$" SQ. H'D. BOLT & NUT
$2\frac{1}{2}$" x $2\frac{1}{2}$" x $\frac{3}{8}$" ANGLE
4'-6"
12452
16561 OR 16562
$\frac{3}{8}$" PLATE, BENT
15"
15"
4" PIPE
12"
8" PIPE
3'-0"
PLATFORM SIMILAR TO 1364
$2\frac{1}{4}$" x $2\frac{1}{4}$" x $\frac{1}{4}$" ANGLE
2"
17
2" PLUG
2" x 2" x 4" TEE M.I. GALV.
2" CONDUIT GALV.
2" UNION - MALE & FEMALE M.I. GALV.
TYPE BC 6 CONDULET & COVER, GALV.
16426, 16427 OR 16403 MODIFIED FOR 8" PIPE
RAILROAD
CROSSING
2
TRACKS
CLEARANCE SIGN WHERE REQUIRED, TO BE FURNISHED BY RAILROAD CO.
164510, 164511 OR 16443 MODIFIED FOR 8" PIPE
SIMILAR TO 1619
14'-6"
16465 OR 16466 MODIFIED FOR 8" PIPE
STOP ON RED SIGNAL
JUNCTION BOX, OPTIONAL
0 1 2 3 4
SCALE OF FEET
16901
16871
12"
HIGHWAY SURFACE

16881 MAST ONLY WITH BASE, PINNACLE AND CANTILEVER ATTACHMENT

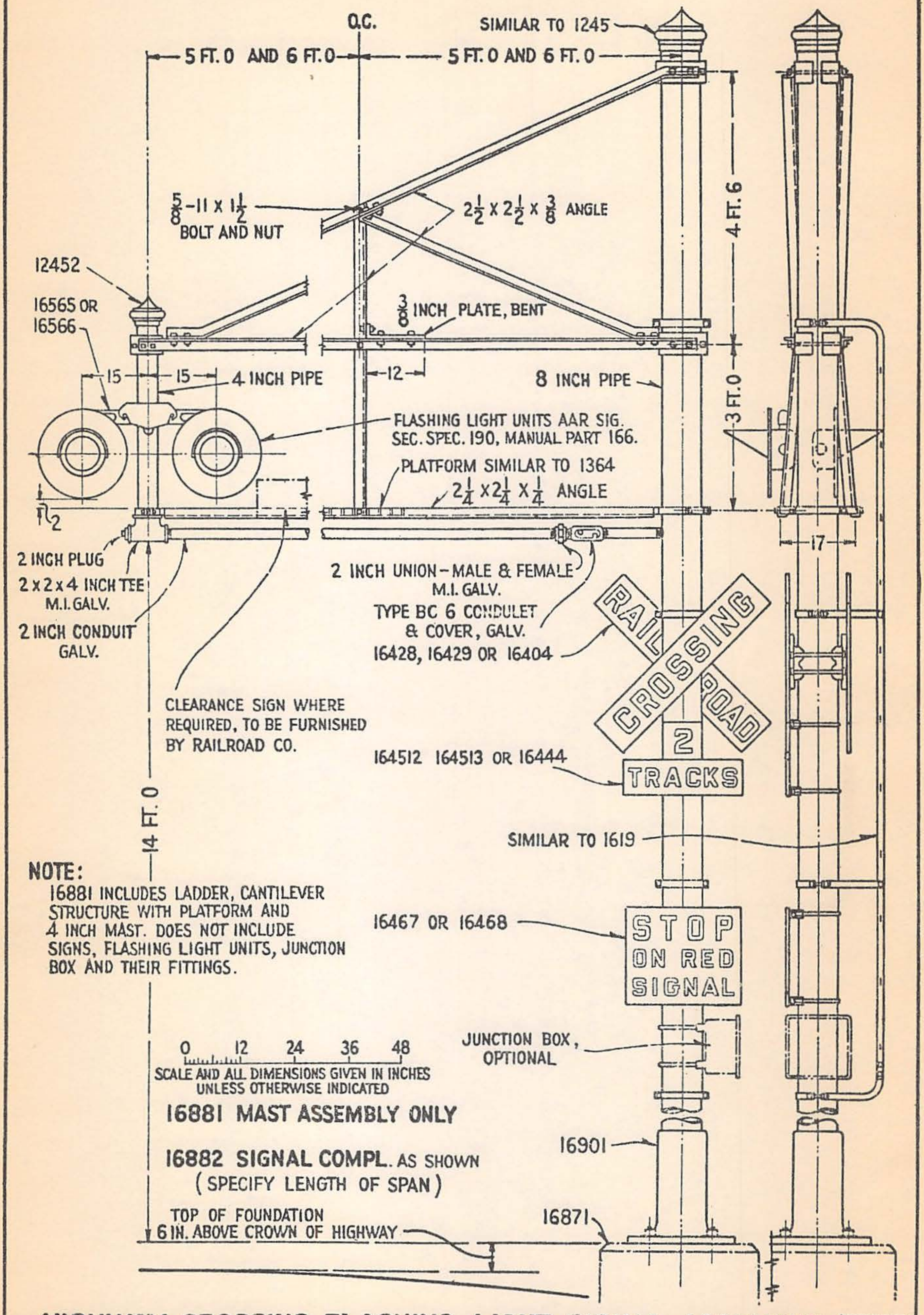
16882 SIGNAL COMPL. AS SHOWN (SPECIFY LENGTH OF SPAN)

HIGHWAY CROSSING FLASHING LIGHT SIGNAL ASSEMBLY

10 FT. AND 12 FT. CANTILEVER SPAN

M-1942 OCT. 1942

AAR SIG. SEC. 1688A


O.C.
5 FT. 0 AND 6 FT. 0
5 FT. 0 AND 6 FT. 0
SIMILAR TO 1245
$\frac{5}{8}$-11 x 1$\frac{1}{2}$ BOLT AND NUT
2$\frac{1}{2}$ x 2$\frac{1}{2}$ x $\frac{3}{8}$ ANGLE
4 FT. 6
12452
16565 OR 16566
$\frac{3}{8}$ INCH PLATE, BENT
15
15
4 INCH PIPE
12
8 INCH PIPE
3 FT. 0
FLASHING LIGHT UNITS AAR SIG. SEC. SPEC. 190, MANUAL PART 166.
PLATFORM SIMILAR TO 1364
2$\frac{1}{4}$ x 2$\frac{1}{4}$ x $\frac{1}{4}$ ANGLE
1$\frac{1}{2}$
17
2 INCH PLUG
2 x 2 x 4 INCH TEE M.I. GALV.
2 INCH CONDUIT GALV.
2 INCH UNION - MALE & FEMALE M.I. GALV.
TYPE BC 6 CONDULET & COVER, GALV.
16428, 16429 OR 16404
RAILROAD CROSSING
CLEARANCE SIGN WHERE REQUIRED, TO BE FURNISHED BY RAILROAD CO.
164512 164513 OR 16444
2
TRACKS
14 FT. 0
SIMILAR TO 1619
16467 OR 16468
STOP ON RED SIGNAL
JUNCTION BOX, OPTIONAL
0 12 24 36 48
SCALE AND ALL DIMENSIONS GIVEN IN INCHES UNLESS OTHERWISE INDICATED
16901
16871
TOP OF FOUNDATION 6 IN. ABOVE CROWN OF HIGHWAY

NOTE:
16881 INCLUDES LADDER, CANTILEVER STRUCTURE WITH PLATFORM AND 4 INCH MAST. DOES NOT INCLUDE SIGNS, FLASHING LIGHT UNITS, JUNCTION BOX AND THEIR FITTINGS.

16881 MAST ASSEMBLY ONLY

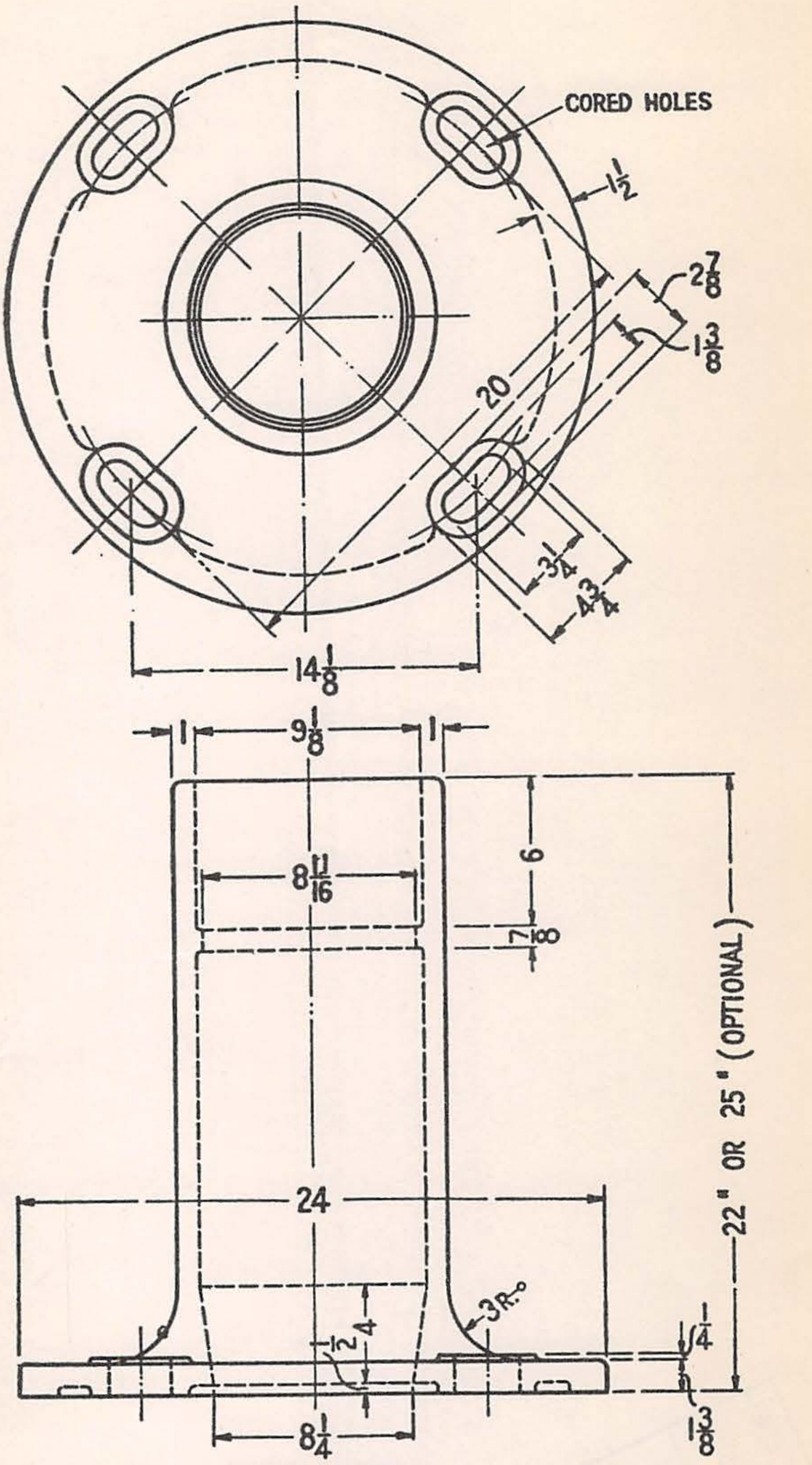
16882 SIGNAL COMPL. AS SHOWN
(SPECIFY LENGTH OF SPAN)

HIGHWAY CROSSING FLASHING LIGHT SIGNAL ASSEMBLY

10 FT. AND 12 FT. CANTILEVER SPAN

					M-1947	SEP. 1947	M-1945	OCT. 1945	M-1942	OCT. 1942

AAR
SIG. SEC.
1688C


CORED HOLES
1½
2⅞
1⅜
20
3¼
4¾
14⅛
1
9⅛
1
8 11/16
6
7/8
22" OR 25" (OPTIONAL)
24
3R.
½
4
¼
1⅜
8¼

16901 BASE
CAST IRON

0 1 2 3 6 9 12
SCALE & ALL DIMENSIONS GIVEN IN INCHES

BASE FOR 8 INCH MAST

M-1942 OCT.1942 AAR SIG. SEC. 1690A

Cast iron shall be in accordance with Specification for Gray Iron Castings.

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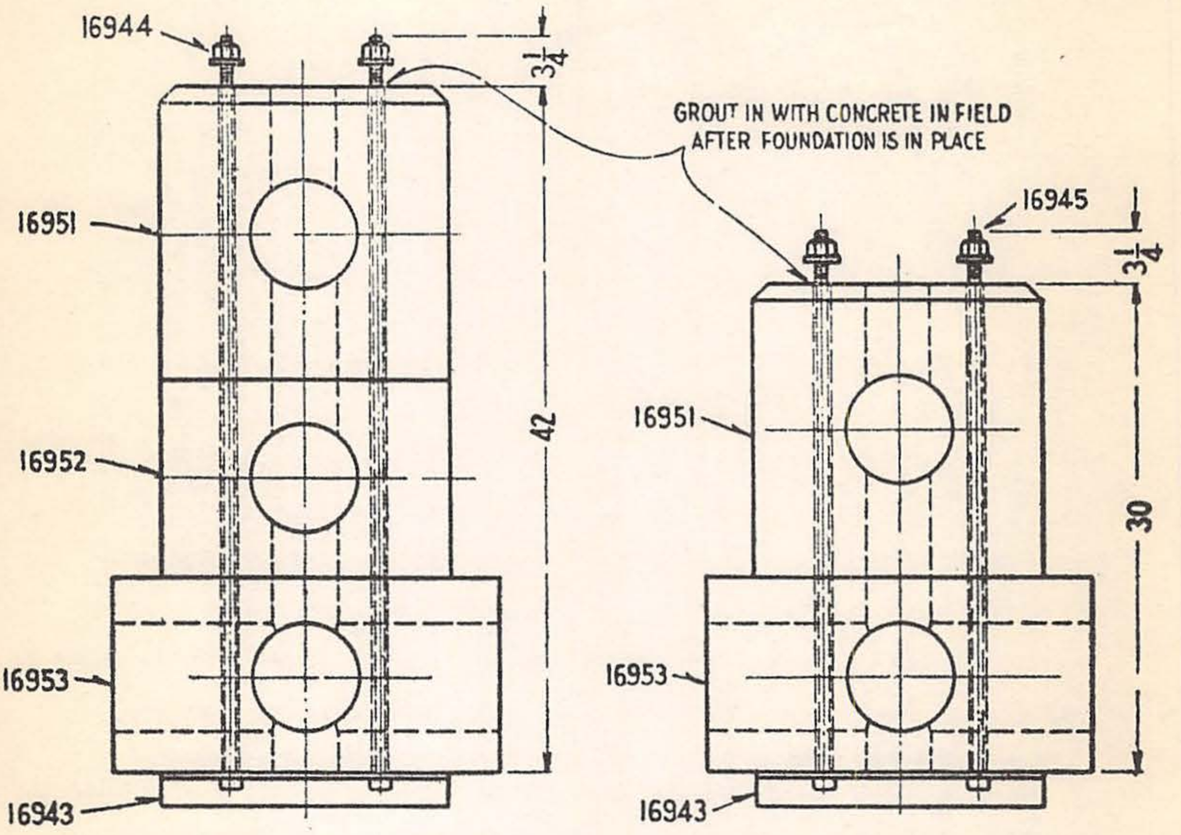
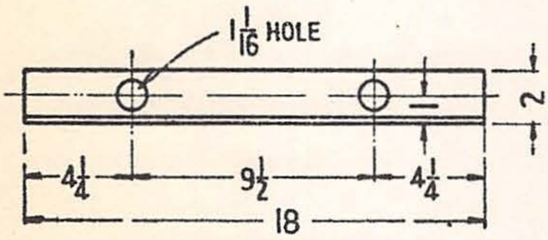
MAY 8 1944
A.M.
Ans'd
Date


16944
$3\frac{1}{4}$
GROUT IN WITH CONCRETE IN FIELD AFTER FOUNDATION IS IN PLACE
16951
16945
$3\frac{1}{4}$
42
16951
16952
30
16953
16953
16943
16943

16941 3 UNIT FOUNDATION COMPL.

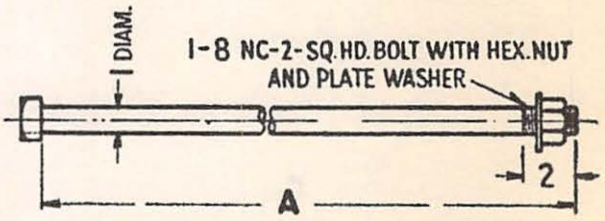
16942 2 UNIT FOUNDATION COMPL.

NOTE: BOLTS AND ANGLE IRON SHALL BE PAINTED WITH ASPHALT PAINT BEFORE ASSEMBLY.


$1\frac{1}{16}$ HOLE
2
$4\frac{1}{4}$
$9\frac{1}{2}$
$4\frac{1}{4}$
18

16943 ANCHOR IRON

$1\frac{1}{2} \times 2 \times \frac{1}{4}$ ANGLE 2.77 LB. PER FT.


1 DIAM.
1-8 NC-2-SQ.HD. BOLT WITH HEX. NUT AND PLATE WASHER
2
A

16944 ANCHOR BOLT - A = $45\frac{1}{2}$

16945 " " - A = $33\frac{1}{2}$

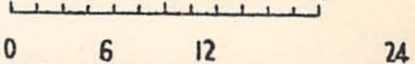
O. H. STEEL GALVANIZED OR CADMIUM PLATED AFTER THREADS HAVE BEEN CUT

NOTE: FOUNDATIONS SHALL BE MADE OF PORTLAND CEMENT CONCRETE IN ACCORDANCE WITH AMERICAN RAILWAY ENGINEERING ASSOCIATION SPECIFICATION.

COARSE AGGREGATE SHALL CONSIST OF $\frac{3}{4}$ INCH MAXIMUM SIZE STONE OR GRAVEL.

NOT LESS THAN 6 SACKS OF CEMENT SHALL BE USED PER CUBIC YARD OF CONCRETE.

WATER CEMENT RATIO TO PRODUCE A COMPRESSIVE STRENGTH OF 2500 POUNDS PER SQUARE INCH AFTER 28 DAYS SHALL BE USED.


0
6
12
0
6
12
24

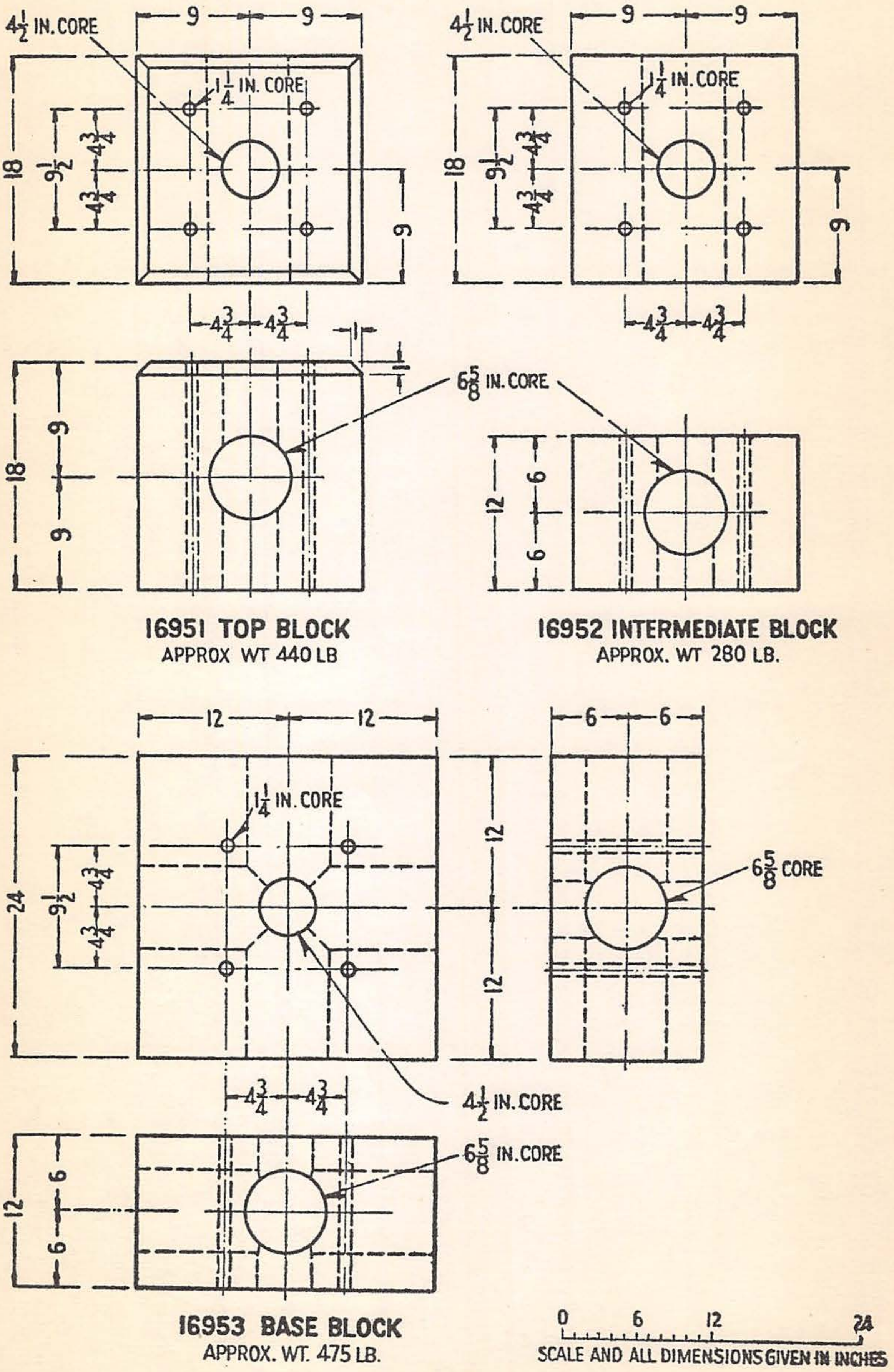
SCALES AND ALL DIMENSIONS GIVEN IN INCHES

PRECAST FOUNDATION FOR 4 INCH MAST

DETAILS AND ASSEMBLIES

M-1939 MAR.1939

AAR
SIG. SEC.
1694A



4½ IN. CORE
1¼ IN. CORE
9
9
18
9½
4¾
4¾
4¾
4¾
1
6⅝ IN. CORE
6
6
12
12
12
24
6⅝ CORE
4½ IN. CORE
6⅝ IN. CORE
0
6
12
24
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

16951 TOP BLOCK
APPROX WT 440 LB

16952 INTERMEDIATE BLOCK
APPROX. WT 280 LB.

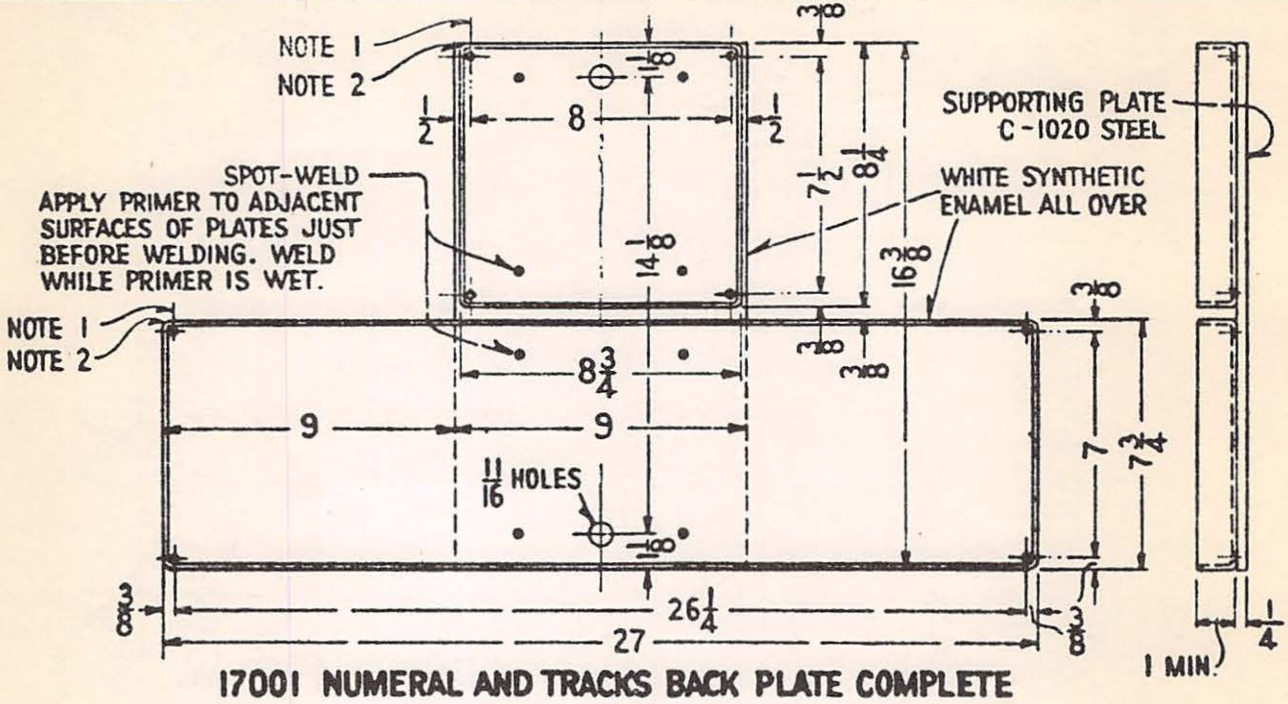
16953 BASE BLOCK
APPROX. WT. 475 LB.

PRECAST FOUNDATION FOR 4 INCH MAST

DETAILS

M-1939 MAR.1939

AAR
SIG. SEC.
1695A



NOTE 1
NOTE 2
SPOT-WELD
APPLY PRIMER TO ADJACENT SURFACES OF PLATES JUST BEFORE WELDING. WELD WHILE PRIMER IS WET.
SUPPORTING PLATE C-1020 STEEL
WHITE SYNTHETIC ENAMEL ALL OVER
8
1/2
1 1/8
7 1/2
8 1/4
14 1/8
16 3/8
3/8
8 3/4
9
9
11/16 HOLES
7
7 3/4
26 1/4
27
1 MIN.
1/4

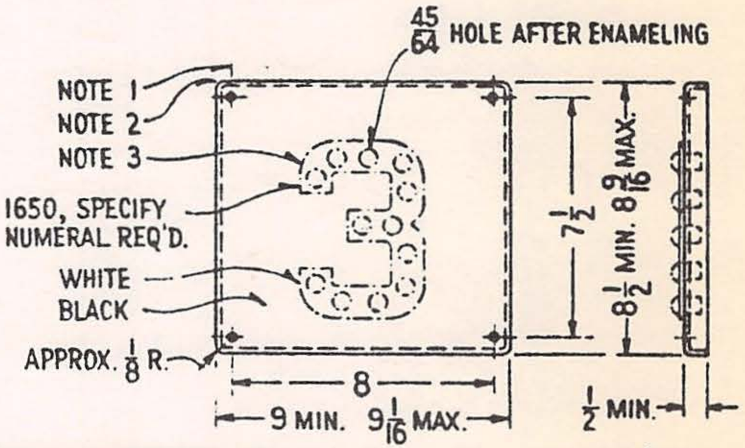
17001 NUMERAL AND TRACKS BACK PLATE COMPLETE

0 1 2 3 6 9 12
SCALE AND ALL DIMENSIONS GIVEN IN INCHES

NOTE 1:
HOLES SUITABLE FOR THEFT-RESISTING TYPE SCREWS AND NUTS.

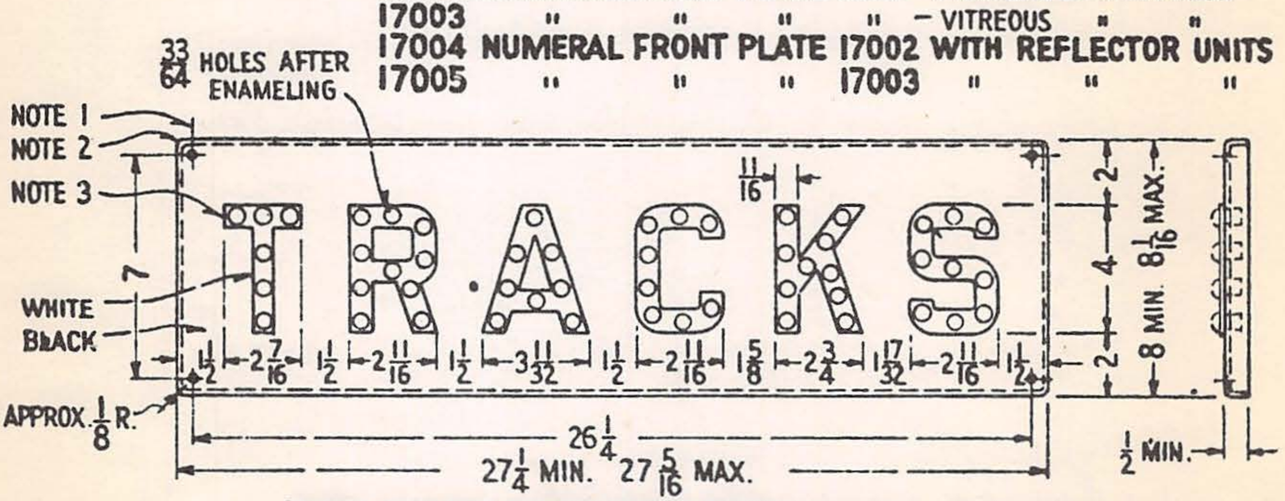
NOTE 2:
UNLESS DRAWN, CORNERS SHALL BE CLOSED BY WELDING.

NOTE 3:
EMBOSSING REQUIRED FOR SYNTHETIC ENAMEL ONLY.



45/64 HOLE AFTER ENAMELING
NOTE 1
NOTE 2
NOTE 3
1650, SPECIFY NUMERAL REQ'D.
WHITE
BLACK
APPROX. 1/8 R.
3
7 1/2
8 1/2 MIN. 8 9/16 MAX.
8
9 MIN. 9 1/16 MAX.
1/2 MIN.

17002 NUMERAL FRONT PLATE ONLY — SYNTHETIC ENAMEL FINISH
17003 " " " " — VITREOUS " "
17004 NUMERAL FRONT PLATE 17002 WITH REFLECTOR UNITS
17005 " " " 17003 " " "



33/64 HOLES AFTER ENAMELING
NOTE 1
NOTE 2
NOTE 3
WHITE
BLACK
APPROX. 1/8 R.
TRACKS
11/16
7
2
4
2
8 MIN. 8 1/16 MAX.
1 1/2
2 7/16
1 1/2
2 11/16
1 1/2
3 11/32
1 1/2
2 11/16
1 5/8
2 3/4
1 17/32
2 11/16
1 1/2
26 1/4
27 1/4 MIN. 27 5/16 MAX.
1/2 MIN.

17006 TRACKS FRONT PLATE ONLY — SYNTHETIC ENAMEL FINISH
17007 " " " " VITREOUS " "
17008 TRACKS FRONT PLATE 17006 WITH REFLECTOR UNITS
17009 " " " 17007 " " "

NUMBER OF TRACKS SIGN

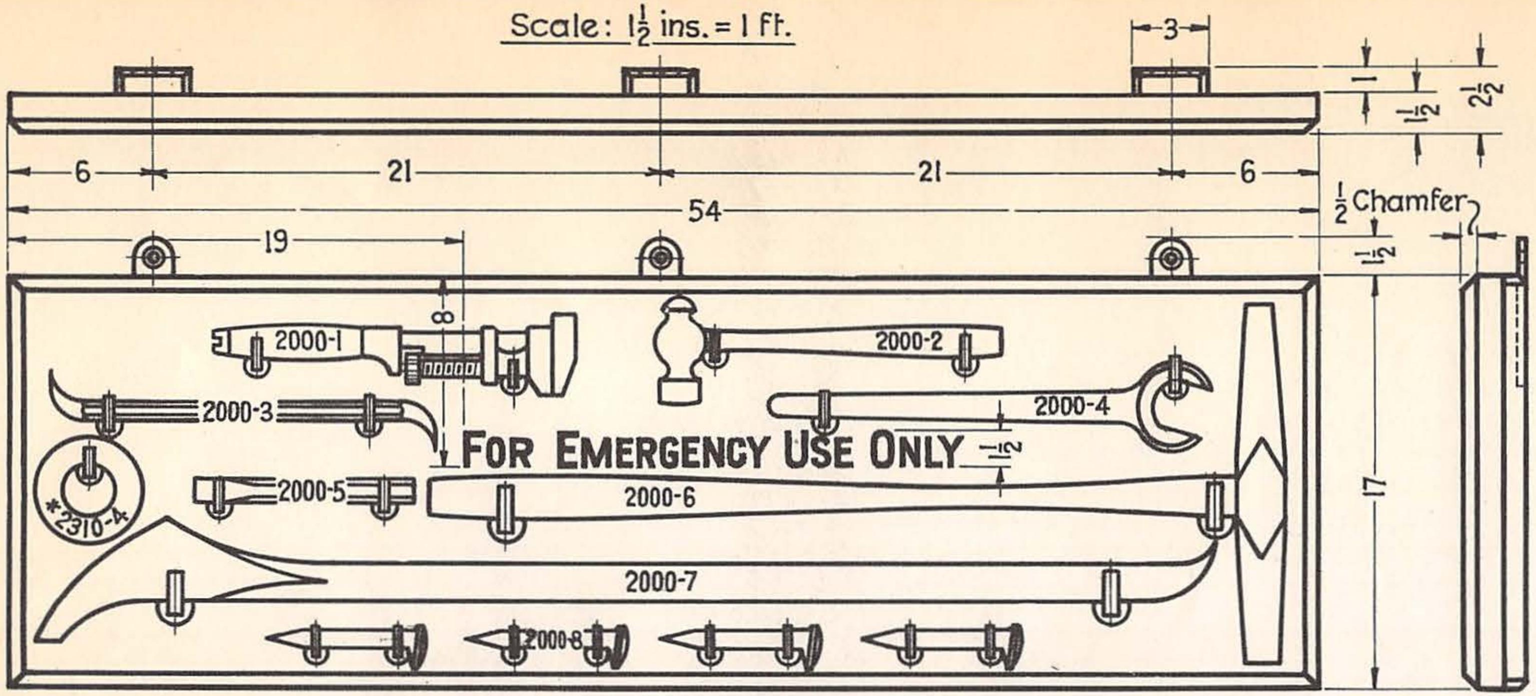
REFLECTOR TYPE — DETAILS

AAR SIG. SEC. 1700A
M-1949 SEP. 1949

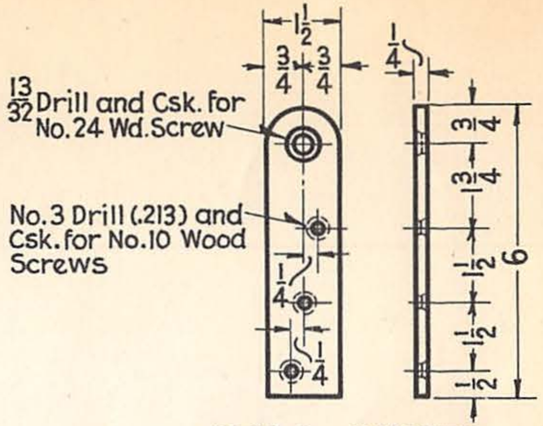
Material and painting shall be in accordance with Specifications 155 and 156, Manual Parts 44 and 43.

PRINTED IN U. S. A.

Scale: 1½ ins. = 1 ft.



3
1
1½
2½
6
21
21
6
54
19
½ Chamfer
1½
8
17
1½
2000-1
2000-2
2000-3
2000-4
2000-5
2000-6
2000-7
2000-8
*2310-4
FOR EMERGENCY USE ONLY



13/32 Drill and Csk. for No.24 Wd.Screw
No.3 Drill (.213) and Csk. for No.10 Wood Screws
1½
¾
¾
¼
¾
1¾
1½
1½
½
6
¼
¼

2000-9 HANGER

Strap iron

Scale: 2 ins. = 1 ft.

2000-12 TOOL BOARD COMPL. - Without Tools or mounting hooks	
REF. NO.	MATERIAL
2000-9	3-Hangers
2000-10	1-Oak board-54"x 17"x 1½"
2000-11	3-Wood cleats-3"x 17"x 1"
	24-No.10 x 1¾-Flat hd. wood screws
	3-No.24 x 1½- " " " "
	FINISH: Board to be made from well seasoned oak and given one coat filler and two coats varnish. Letter in black as shown.

2000-13 TOOL BOARD COMPL. WITH TOOLS	
REF. NO.	EQUIPMENT
2000-1	1 – Monkey wrench
2000-2	1 – Machine hammer
2000-3	1 – Tommy bar
2000-4	1 – Switch adjustment wrench
2000-5	1 – Cold chisel
2000-6	1 – Spike maul
2000-7	1 – Claw bar
2000-8	4-Standard track spikes
* 2310-4	5-Lever blocks and markers
700-4	4-Hooks-For mounting maul and bar
700-5	19-Hooks- " " other equipment
	NOTES: All tools to be painted Red. * See Plans 2310 and 2311 for types applicable to other than S.& F. and Style 'A' Interlocking Machines.

Scales: as shown - all dimensions given in inches.

NOTE: When ordering give Number and Name shown in large type or in the Table.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

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N.Y.C.R.R.(OGL).
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B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2000

ISSUE	DATE
1	5-31-1911
2	12-11-1931

TOOL BOARD AND EQUIPMENT

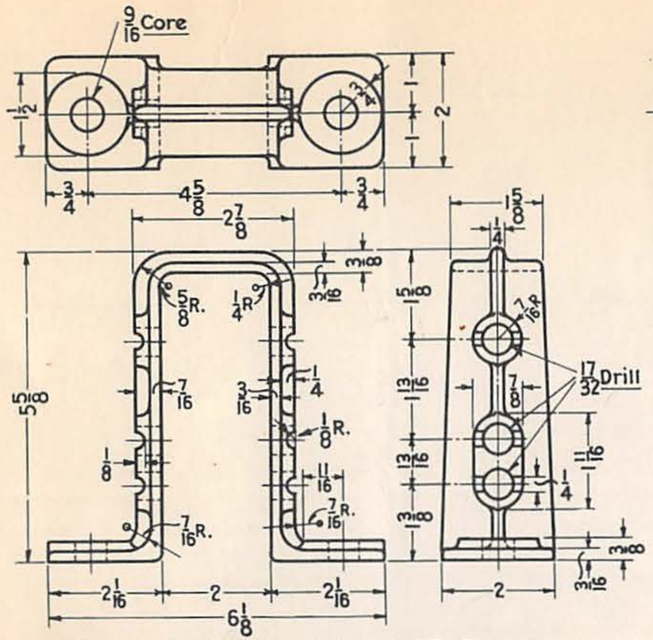
For Interlocking Towers

Approved by Representatives of Lines shown.

J.C. Mock
Chairman

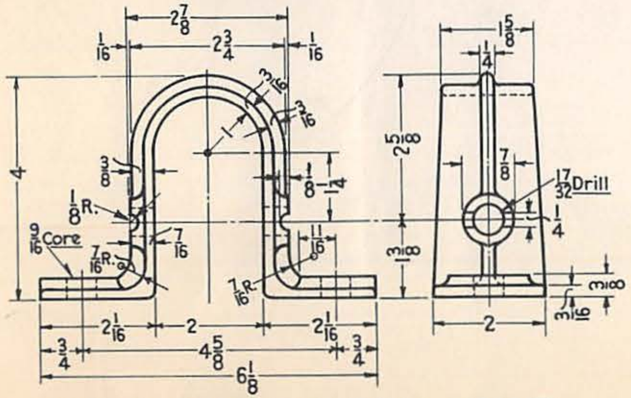
WAH

DEPT. 41
MAY
2
1932
J. S. & S. CO.


$\frac{9}{16}$ Core
$\frac{3}{4}$
$1\frac{1}{2}$
2
$\frac{3}{4}$
$4\frac{5}{8}$
$\frac{3}{4}$
$2\frac{7}{8}$
$\frac{5}{8}$R.
$\frac{1}{4}$R.
$\frac{3}{8}$
$\frac{3}{16}$
$5\frac{5}{8}$
$\frac{7}{16}$
$\frac{3}{16}$
$\frac{1}{4}$
$\frac{1}{8}$R.
$\frac{1}{8}$
$\frac{11}{16}$
$\frac{7}{16}$R.
$\frac{7}{16}$R.
$2\frac{1}{16}$
2
$2\frac{1}{16}$
$6\frac{1}{8}$
$1\frac{5}{8}$
$\frac{1}{4}$
$1\frac{5}{8}$
$\frac{7}{16}$R
$\frac{17}{32}$ Drill
$1\frac{13}{16}$
$\frac{7}{8}$
$1\frac{13}{16}$
$\frac{1}{4}$
$1\frac{11}{16}$
$1\frac{3}{8}$
$\frac{3}{8}$
$\frac{3}{16}$
2

2299-7 DOUBLE SHEAVE STAND

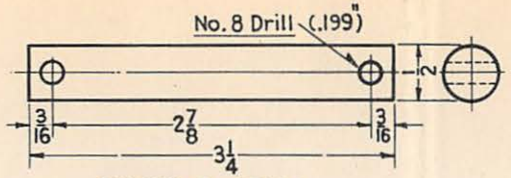
Mall. iron


$2\frac{7}{8}$
$\frac{1}{16}$
$2\frac{3}{4}$
$\frac{1}{16}$
$\frac{3}{16}$
$\frac{3}{16}$
4
$\frac{3}{8}$
$\frac{1}{8}$R.
$\frac{9}{16}$ Core
$\frac{7}{16}$R.
$\frac{7}{16}$
$\frac{1}{8}$
$\frac{1}{4}$
$\frac{11}{16}$
$\frac{7}{16}$R.
$2\frac{1}{16}$
2
$2\frac{1}{16}$
$\frac{3}{4}$
$4\frac{5}{8}$
$\frac{3}{4}$
$6\frac{1}{8}$
$1\frac{5}{8}$
$\frac{1}{4}$
$2\frac{5}{8}$
$\frac{7}{8}$
$\frac{17}{32}$ Drill
$1\frac{3}{8}$
$\frac{1}{4}$
$\frac{3}{8}$
$\frac{3}{16}$
2

2299-8 SINGLE SHEAVE STAND

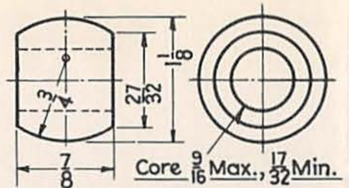
Mall. iron

Scale: ②


No. 8 Drill (.199")
$\frac{1}{2}$
$\frac{3}{16}$
$2\frac{7}{8}$
$\frac{3}{16}$
$3\frac{1}{4}$

2299-9 PIN

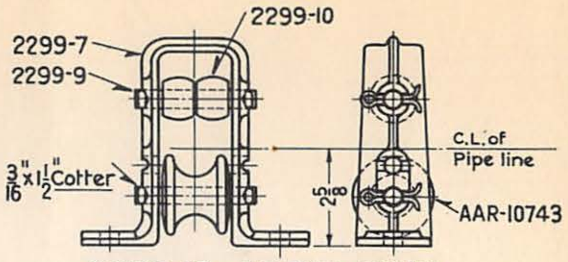
C. R. Steel


$1\frac{1}{8}$
$\frac{27}{32}$
$\frac{3}{4}$
$\frac{7}{8}$
Core $\frac{9}{16}$ Max., $\frac{17}{32}$ Min.

2299-10 TOP ROLLER

Cast iron

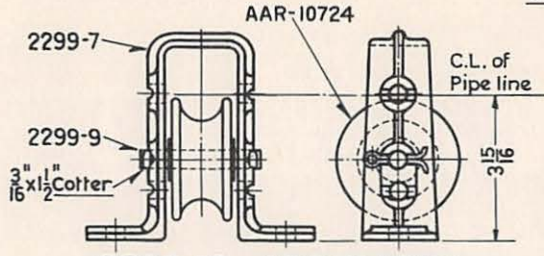
Scale: ③


2299-7
2299-9
2299-10
$\frac{3}{16}$" x $1\frac{1}{2}$" Cotter
$2\frac{5}{8}$
C.L. of Pipe line
AAR-10743

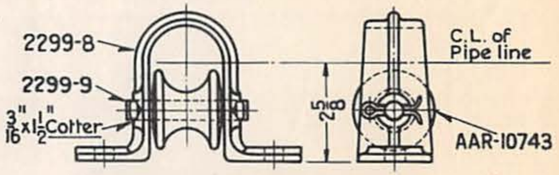
2299-12 ASSEMBLY

PIPE CARRIERS COMPL.

Scale: ①


AAR-10724
2299-7
2299-9
$\frac{3}{16}$" x $1\frac{1}{2}$" Cotter
C.L. of Pipe line
$3\frac{15}{16}$

2299-13 ASSEMBLY

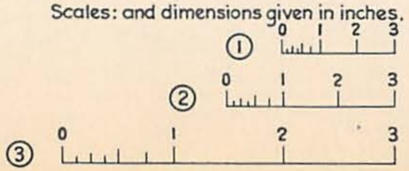

2299-8
2299-9
$\frac{3}{16}$" x $1\frac{1}{2}$" Cotter
C.L. of Pipe line
$2\frac{5}{8}$
AAR-10743

2299-14 ASSEMBLY

NOTES: See A.A.R. Drawings 1072B and 1074A for detail of sheaves and 1075A for transverse carrier support.

When ordering parts give number and name shown in large type.

Scales: and dimensions given in inches.


① 0 1 2 3
② 0 1 2 3
③ 0 1 2 3

NEW YORK CENTRAL SYSTEM

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2299

ISSUE	DATE
1	7-9-1929
2	4-10-1934
3	6-10-1937

ONE-WAY PIPE CARRIERS

Approved by Representatives of Lines shown.

Chairman

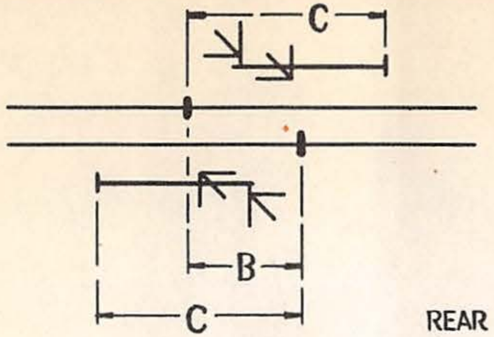

FIG. 1

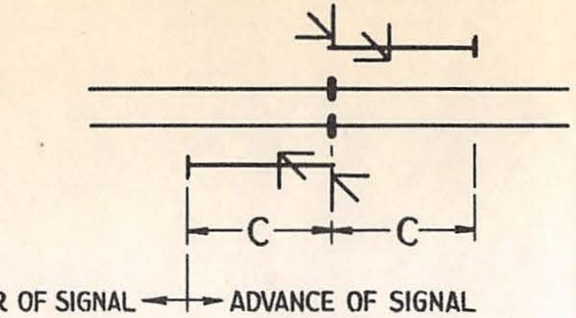

FIG. 2

AUTOMATIC SIGNALS ON INDIVIDUAL FOUNDATIONS

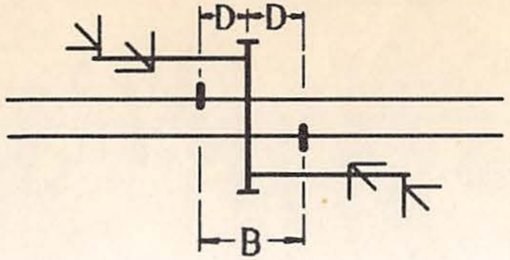

FIG. 3

AUTOMATIC SIGNALS ON COMMON BRIDGE OR MAST

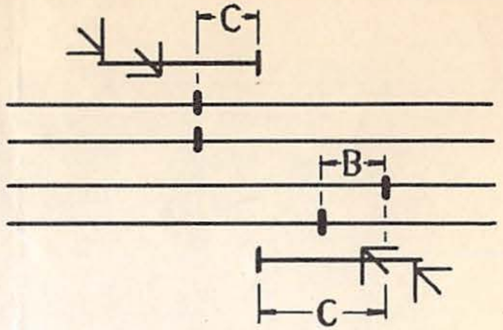

FIG. 4

AUTOMATIC SIGNALS MULTIPLE TRACKS

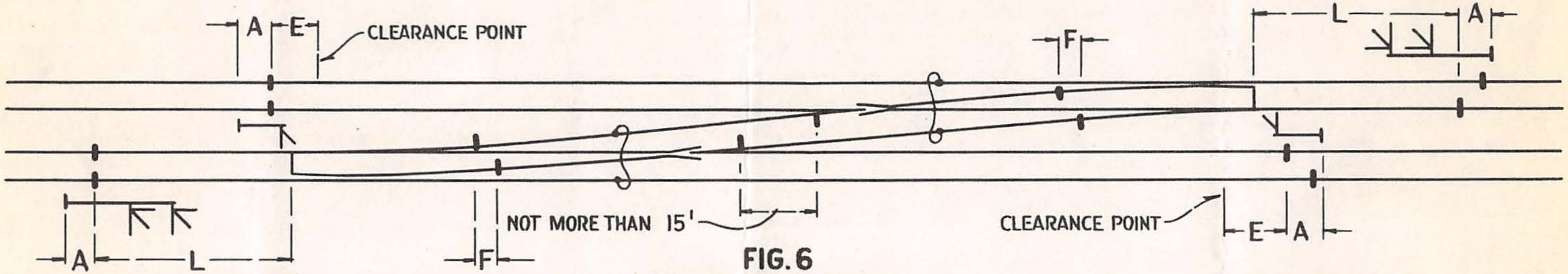

FIG. 5

FIG. 6

INTERLOCKED CROSSOVER

FIG. 7

NOTE:

A — MAY VARY FROM 0' TO 5'.
B — NOT MORE THAN 20'.
C — MAY VARY FROM 0' TO 39'.
D — MAY VARY FROM 0' TO B.
E — NOT LESS THAN 7'.
F — NOT MORE THAN 4'-6".
L — NOT LESS THAN 50' EXCEPT IN TERMINAL TERRITORY WHERE IT SHALL NOT BE LESS THAN 5'.

1. — NO JOINT SHALL BE IN REAR OF SIGNAL EXCEPT AS IN FIG. 3.
2. — JOINTS MAY BE REVERSED AS TO RAILS.
3. — AT CUT SECTIONS, TOLERANCE IS ALLOWABLE AS PER DIMENSION B.
4. — IN ELECTRIC PROPULSION TERRITORY, OR WHERE FOREIGN CURRENT IS PRESENT, JOINTS SHALL BE PLACED OPPOSITE AS IN FIGS. 2, 4, 5.
5. — WHERE JOINTS ARE REQUIRED TO BE OPPOSITE, STAGGER SHALL NOT EXCEED 1 INCH.
6. — LOCATION OF JOINTS IS BASED ON THE FOLLOWING:
   a MINIMUM WHEEL BASE OF EQUIPMENT = 32'
   b MINIMUM WHEEL BASE OF TRUCK = 5'
   c MAXIMUM CLEAR SPAN OF EQUIPMENT = 55'
   d MAXIMUM OVERHANG OF EQUIPMENT = 7'

NEW YORK CENTRAL SYSTEM

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2301

ISSUE	DATE
1	4-14-1930
2	9-20-1935
3	3-18-1936

INSULATED JOINT LOCATION
AUTOMATIC & INTERLOCKING SIGNALS

Approved by Representatives of Lines shown.

Chairman.

(CONT'D ON PAGE 2)

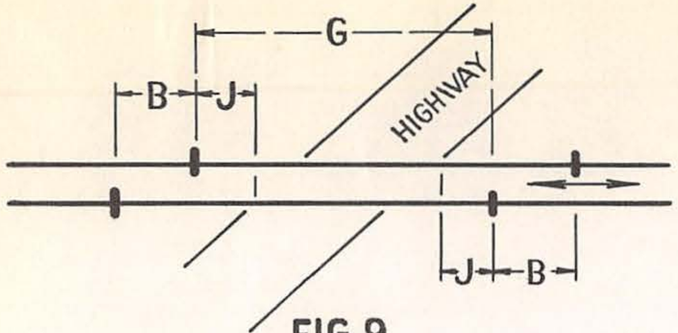

FIG. 9
SIGNALED TRACK

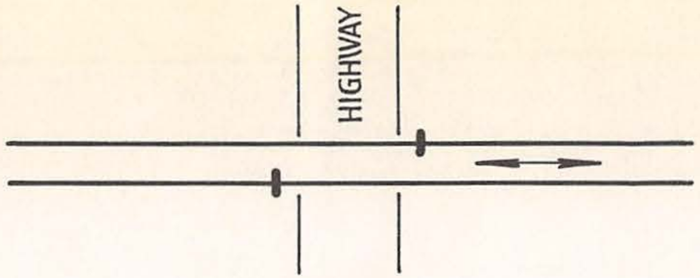

FIG. 10
NON-SIGNALED TRACK

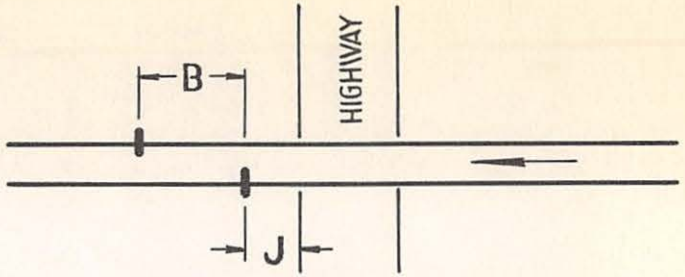

FIG. 11
SIGNALED OR NON-SIGNALED TRACK

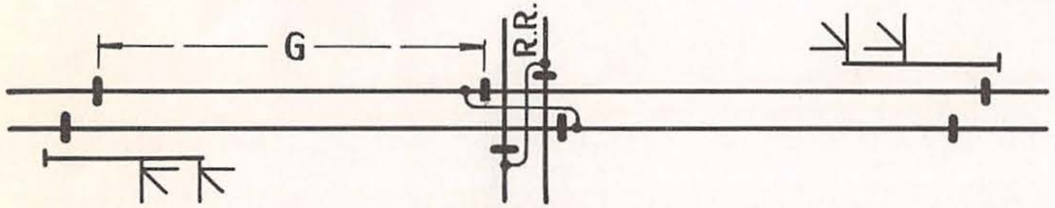

FIG. 12
ONE COMMON RAIL

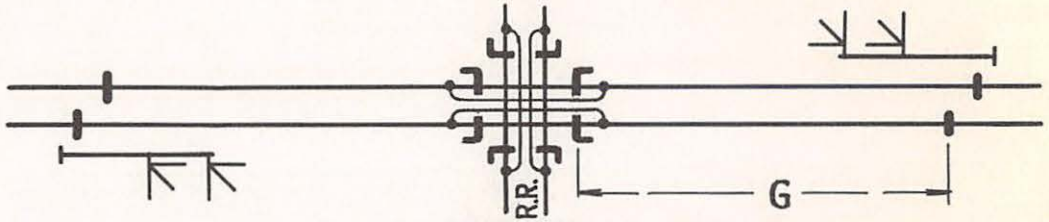

FIG. 13
INSULATED FROGS

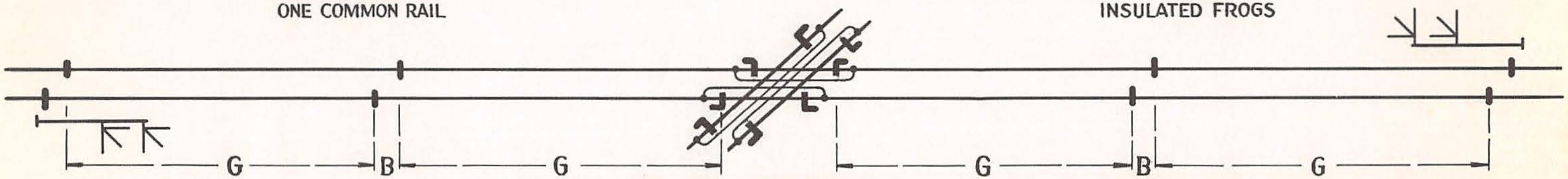

FIG. 14 – TRAP CIRCUIT.
FOR DEAD SECTIONS OF MORE THAN 32'
IN SWITCHING TERRITORY.

NOTE:

B – NOT MORE THAN 20'.
F – NOT MORE THAN 4'-6".
G – NOT LESS THAN 55'.
J – MAY BE NOT TO EXCEED 200' ON SINGLE TRACK OR 100' ON MULTIPLE TRACKS IN ORDER TO UTILIZE EXISTING SIGNAL OR CUT SECTION LOCATION.

NEW YORK CENTRAL SYSTEM

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RUTL.R.R.

2301

ISSUE	DATE
1	4-14-1930
2	9-20-1935

INSULATED JOINT LOCATION
HIGHWAY XINGS – R.R. XINGS

Approved by Representatives of Lines shown.
J C Mock
Chairman.

(CONT'D ON PAGE 3)

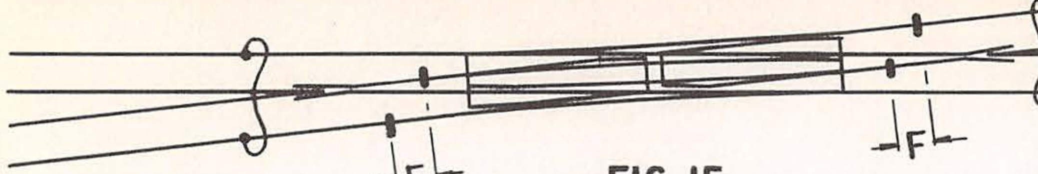

FIG. 15
DOUBLE SLIP

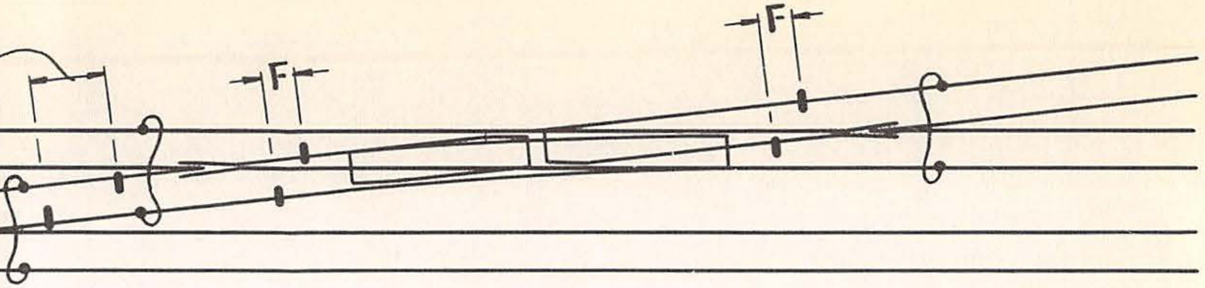

FIG. 16
SINGLE SLIP

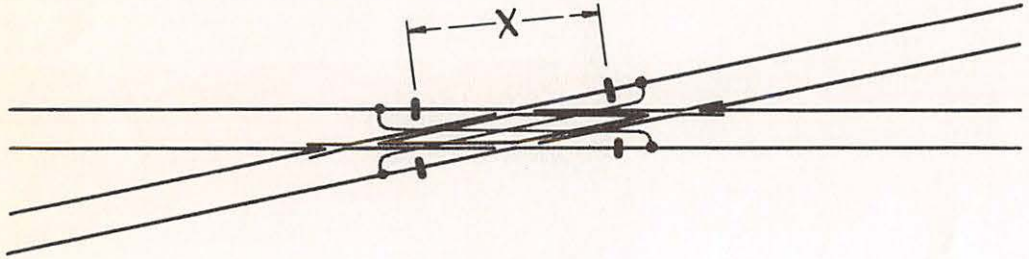

FIG. 17
RIGID CROSSING FROG
DOUBLE RAIL

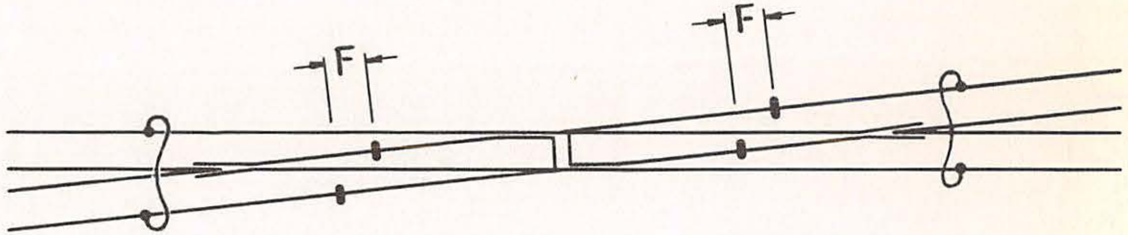

FIG. 18
RIGID OR M.P.F. FROG
SINGLE RAIL

NOTE:
F – NOT MORE THAN 4'-6".
X – NOT MORE THAN 32'.

NEW YORK CENTRAL SYSTEM
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2301

ISSUE	DATE
1	4-14-1930
2	9-20-1935

INSULATED JOINT LOCATION
SLIP SWITCHES AND FROGS

Approved by Representatives of Lines shown.
J.C.Mock
Chairman

(CONT'D ON PAGE 4)

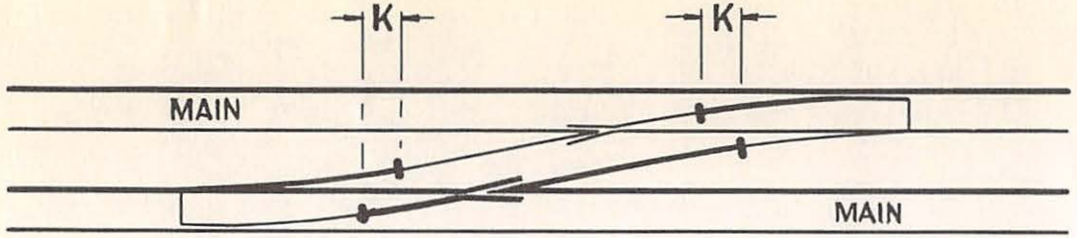
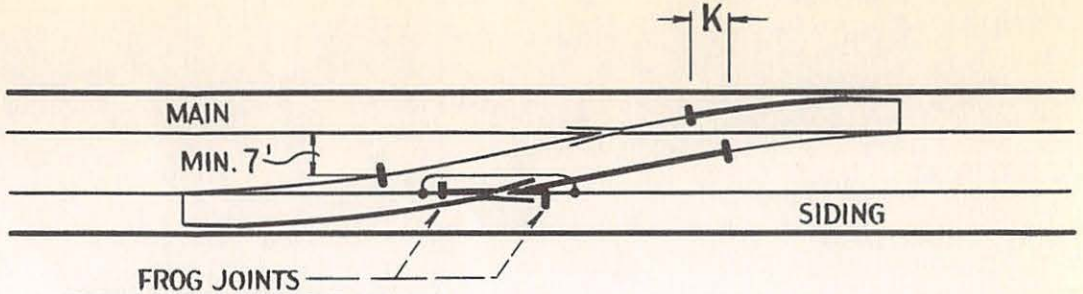


FIG. 19

CROSSOVER-BETWEEN MAIN TRACKS.



FROG JOINTS
THESE JOINTS AND BOND OMITTED
IN NON-SIGNALED TRACK.

FIG. 20

CROSSOVER BETWEEN MAIN AND SIDING.

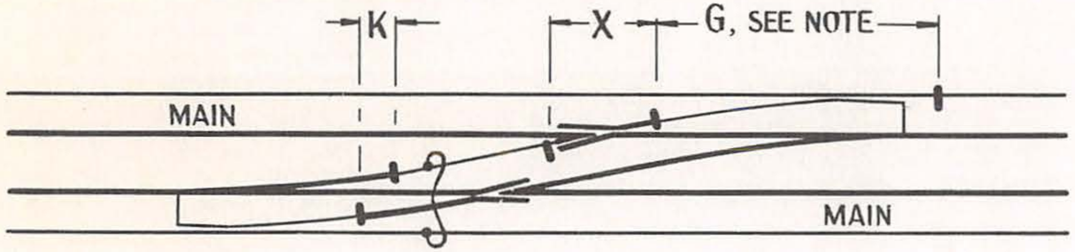
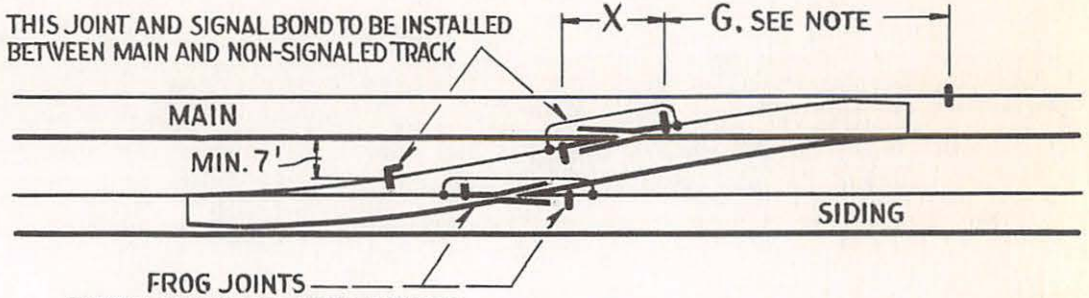


FIG. 21

CROSSOVER-BETWEEN MAIN TRACKS.

THIS JOINT AND SIGNAL BOND TO BE INSTALLED
BETWEEN MAIN AND NON-SIGNALED TRACK



FROG JOINTS
THESE JOINTS AND BOND OMITTED
IN NON-SIGNALED TRACK

FIG. 22

CROSSOVER BETWEEN MAIN AND SIDING.

NOTE:

SIGNAL RAIL ────────
PROPULSION RAIL ━━━━━━━━
X — NOT MORE THAN 32'
G — WHERE 'G' IS LESS THAN 55' OR 'X' IS MORE THAN 32', FIGS. 21 AND 22, TRANSPOSITION SHALL BE MADE TO OBTAIN ARRANGEMENT AS PER FIGS. 19 AND 20.
K — NOT MORE THAN 4'-6". PROPULSION RAILS TO OVERLAP.

NEW YORK CENTRAL SYSTEM
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ISSUE	DATE
1	4-14-1930
2	9-20-1935

INSULATED JOINT LOCATION
CROSSOVERS
ELECTRIC OPERATION TERRITORY

Approved by Representatives of Lines shown.
J C Mock
Chairman.

(CONT'D ON PAGE 5)

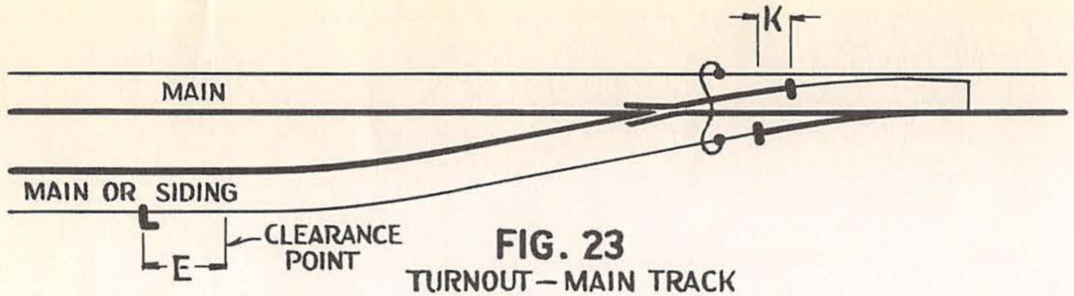
K
MAIN
MAIN OR SIDING
E
CLEARANCE POINT

FIG. 23

TURNOUT—MAIN TRACK

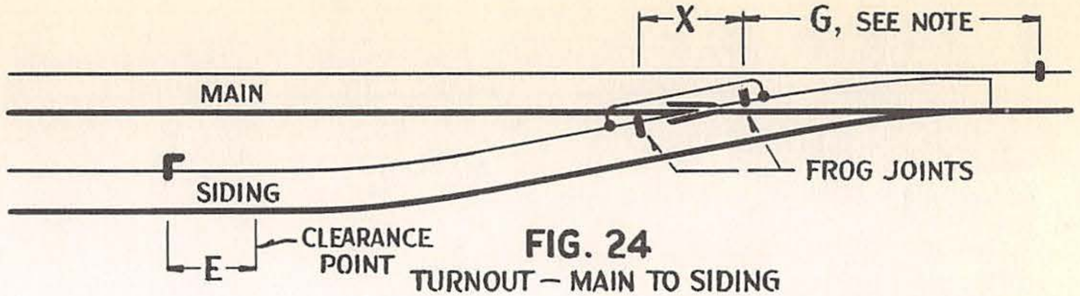
X
G, SEE NOTE
MAIN
SIDING
FROG JOINTS
E
CLEARANCE POINT

FIG. 24

TURNOUT—MAIN TO SIDING

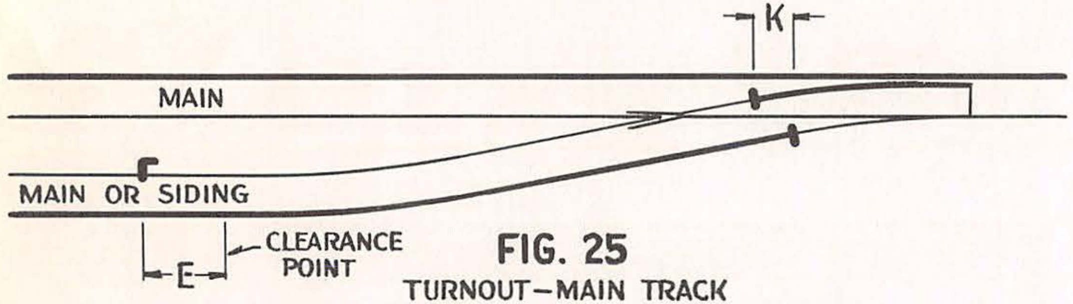
K
MAIN
MAIN OR SIDING
E
CLEARANCE POINT

FIG. 25

TURNOUT—MAIN TRACK

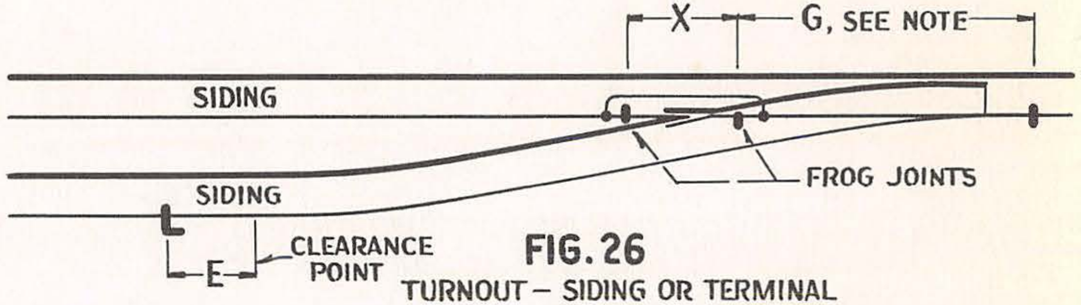
X
G, SEE NOTE
SIDING
SIDING
FROG JOINTS
E
CLEARANCE POINT

FIG. 26

TURNOUT—SIDING OR TERMINAL

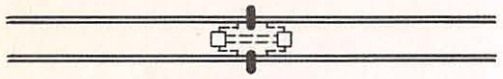

FIG. 27

DOUBLE IMPEDANCE BOND
DOUBLE RAIL TRACK CIRCUIT
ABUTTING DOUBLE RAIL TRACK CIRCUIT

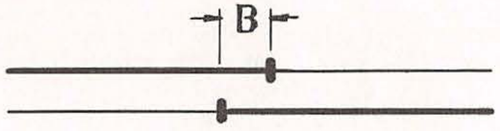

FIG. 28

TRANSPOSITION
SINGLE RAIL

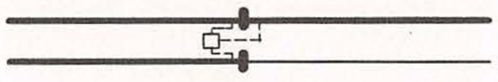

FIG. 29

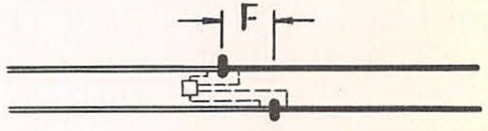

FIG. 30

SINGLE IMPEDANCE BONDS

SINGLE RAIL TRACK CIRCUIT
ABUTTING DOUBLE RAIL TRACK CIRCUIT

DOUBLE RAIL TRACK CIRCUIT
ABUTTING NO TRACK CIRCUIT

NOTE: B — NOT MORE THAN 20'.
E — NOT LESS THAN 7'.
F — NOT MORE THAN 4'-6", WHERE JOINTS ARE REQUIRED TO BE OPPOSITE, STAGGER SHALL NOT EXCEED 1 INCH.
X — NOT MORE THAN 32'.

SIGNAL RAIL ———
PROPULSION RAIL ———
SIGNAL AND PROPULSION RAIL ═══

G — WHERE 'G' IS LESS THAN 55' OR 'X' IS MORE THAN 32' FIGS. 24 AND 26, TRANSPOSITION SHALL BE MADE TO OBTAIN ARRANGEMENT AS PER FIGS. 23 AND 25.
K — NOT MORE THAN 4'-6". PROPULSION RAILS TO OVERLAP.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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2301

ISSUE	DATE
1	4-14-1930
2	9-20-1935

INSULATED JOINT LOCATION
TURNOUTS
ELECTRIC OPERATION TERRITORY

Approved by Representatives of Lines shown.
JCMock
Chairman.

(CONT'D ON PAGE 6)

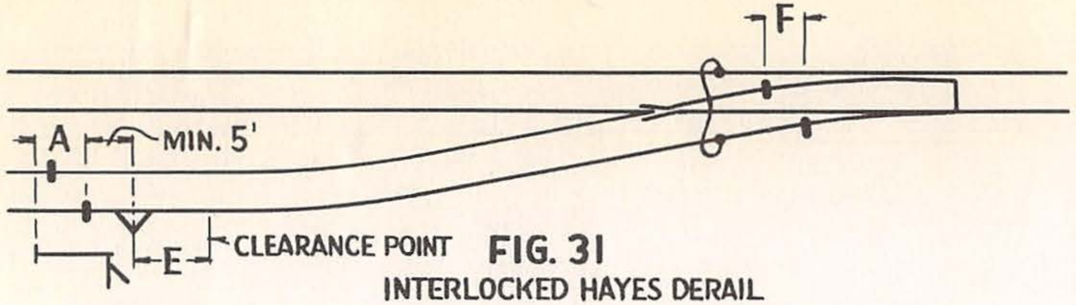
F
A
MIN. 5'
E
CLEARANCE POINT

FIG. 31
INTERLOCKED HAYES DERAIL

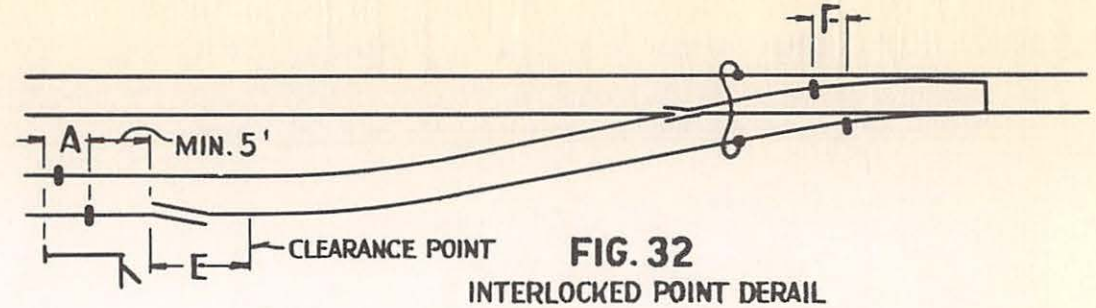
F
A
MIN. 5'
E
CLEARANCE POINT

FIG. 32
INTERLOCKED POINT DERAIL

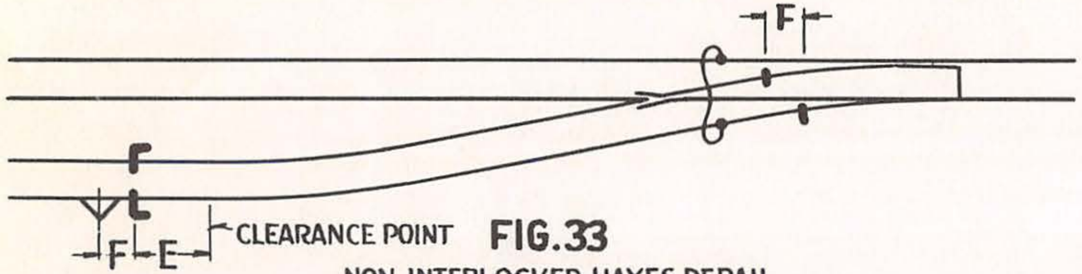
F
F
E
CLEARANCE POINT

FIG. 33
NON INTERLOCKED HAYES DERAIL

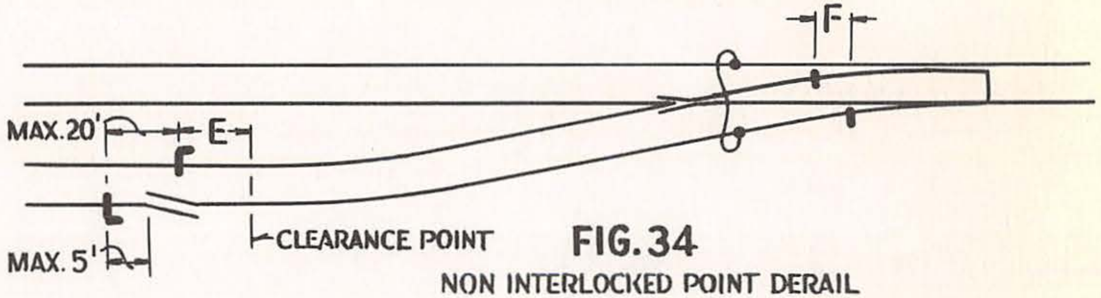
F
MAX. 20'
E
MAX. 5'
CLEARANCE POINT

FIG. 34
NON INTERLOCKED POINT DERAIL

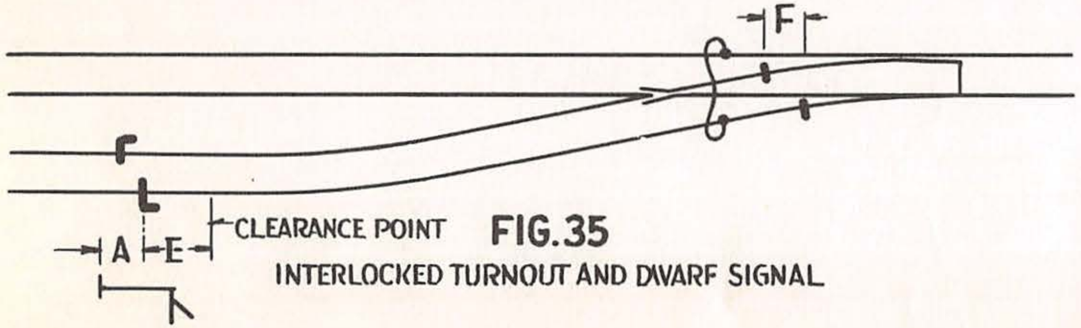
F
A
E
CLEARANCE POINT

FIG. 35
INTERLOCKED TURNOUT AND DWARF SIGNAL

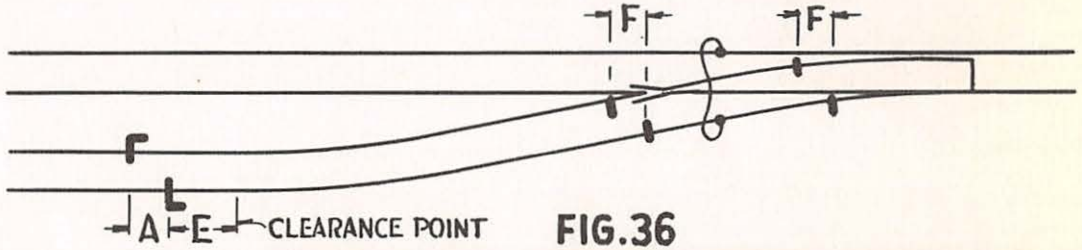
F
F
A
E
CLEARANCE POINT

FIG. 36
NON INTERLOCKED TURNOUT WITH SEPARATE TRACK CIRCUIT

NOTE:

A – MAY VARY FROM 0' TO 5'.
E – NOT LESS THAN 7'.
F – NOT MORE THAN 4'-6.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2301

ISSUE	DATE
1	4-14-1930
2	9-20-1935

INSULATED JOINT LOCATION
TURNOUTS AND DERAILS

Approved by Representatives of Lines shown.
J C Mock
Chairman.

(CONT'D ON PAGE 7)

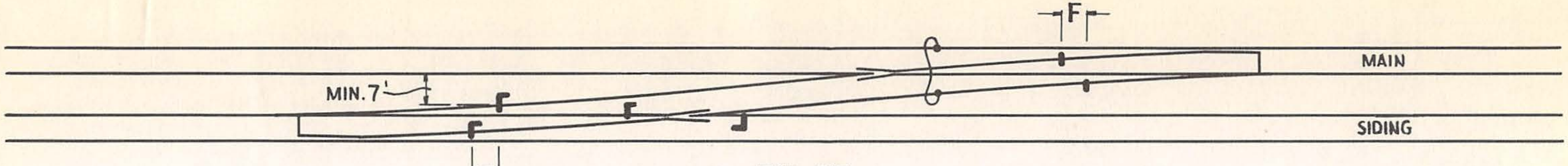
F
MIN. 7'
MAIN
SIDING
F

FIG. 37

NON INTERLOCKED OR BOLTLOCKED CROSSOVER – MAIN TO SIDING.

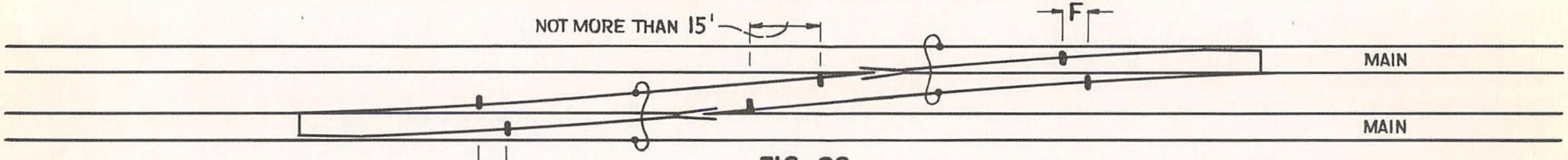
NOT MORE THAN 15'
F
MAIN
MAIN
F

FIG. 38

NON INTERLOCKED OR BOLTLOCKED CROSSOVER – MAIN TO MAIN.

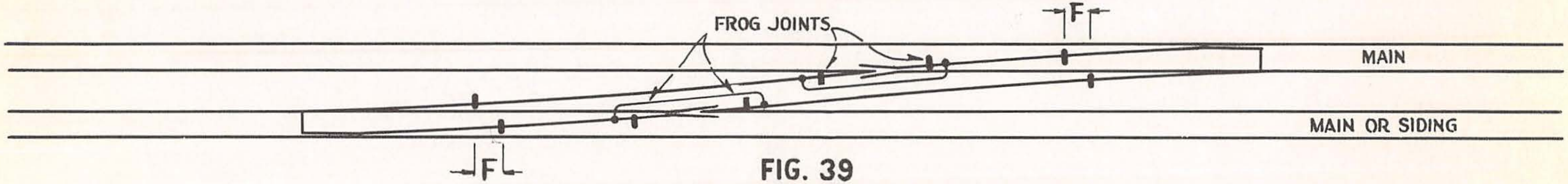
FROG JOINTS
F
MAIN
MAIN OR SIDING
F

FIG. 39

NON INTERLOCKED CROSSOVER – MAIN TO MAIN OR MAIN TO SIDING.
SEPARATE TRACK CIRCUIT,
ALSO FOR DOUBLE RAIL TRACK CIRCUITS
IN ELECTRIC PROPULSION TERRITORY.

NOTE: F – NOT MORE THAN 4'-6".

NEW YORK CENTRAL SYSTEM

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INSULATED JOINT LOCATION

NON INTERLOCKED CROSSOVERS

Approved by Representatives of Lines shown.

JC Mock
Chairman.

(CONT'D ON PAGE 8)

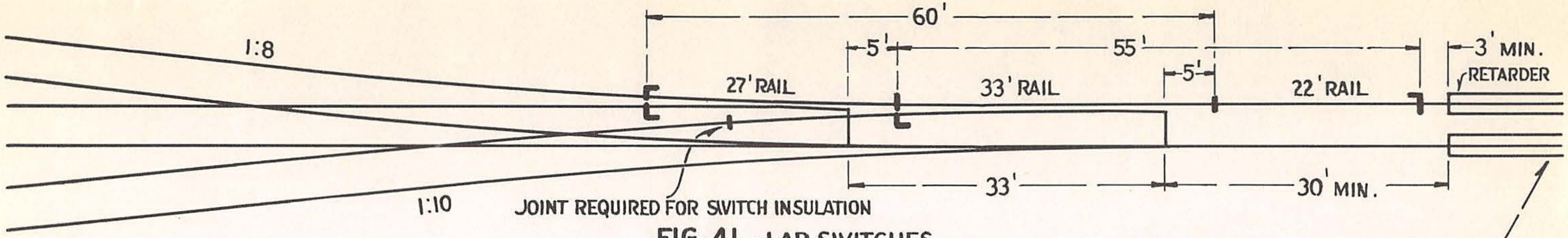
60'
1:8
5'
55'
3' MIN.
RETARDER
27' RAIL
33' RAIL
5'
22' RAIL
33'
30' MIN.
1:10
JOINT REQUIRED FOR SWITCH INSULATION

FIG. 41 - LAP SWITCHES

THE PREFERRED LAYOUT FOR LAP SWITCHES IS SHOWN. FOR OTHER ARRANGEMENTS, NO TRACK CIRCUIT SHALL BE LESS THAN 55' IN LENGTH.

LOCATION OF RETARDER WHEN TRACK CIRCUIT DOES NOT EXTEND THROUGH RETARDER.

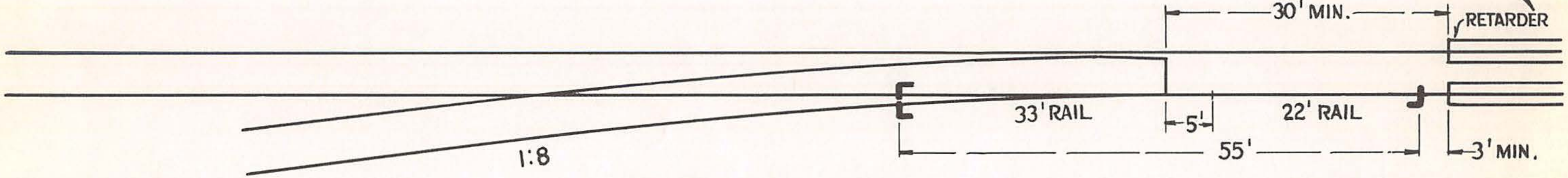
30' MIN.
RETARDER
33' RAIL
5'
22' RAIL
55'
3' MIN.
1:8

FIG. 42 - SINGLE SWITCH.

NOTE:

LENGTH OF TRACK CIRCUIT IN REAR OF SWITCH POINT IS SHOWN FOR SPEED OF 15 M.P.H. WHICH IS MAXIMUM SPEED ENCOUNTERED IN OPERATION OF RETARDER YARDS, AND IS BASED ON THE FOLLOWING FORMULA:

SWITCH MACHINE OPERATION	0.85 SEC.	
TRACK CIRCUIT SHUNT	0.10 "	
25 % FACTOR SAFETY	0.24 "	
APPROACH LOCKING REQUIRED	1.19 "	27 FT. AT 15 M.P.H.

WHERE THESE FACTORS VARY FROM THE ABOVE, APPROACH LOCKING DISTANCE SHOULD BE VARIED ACCORDINGLY.
INSULATED JOINTS MAY BE PLACED IN OPPOSITE RAIL IF DESIRED.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

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B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

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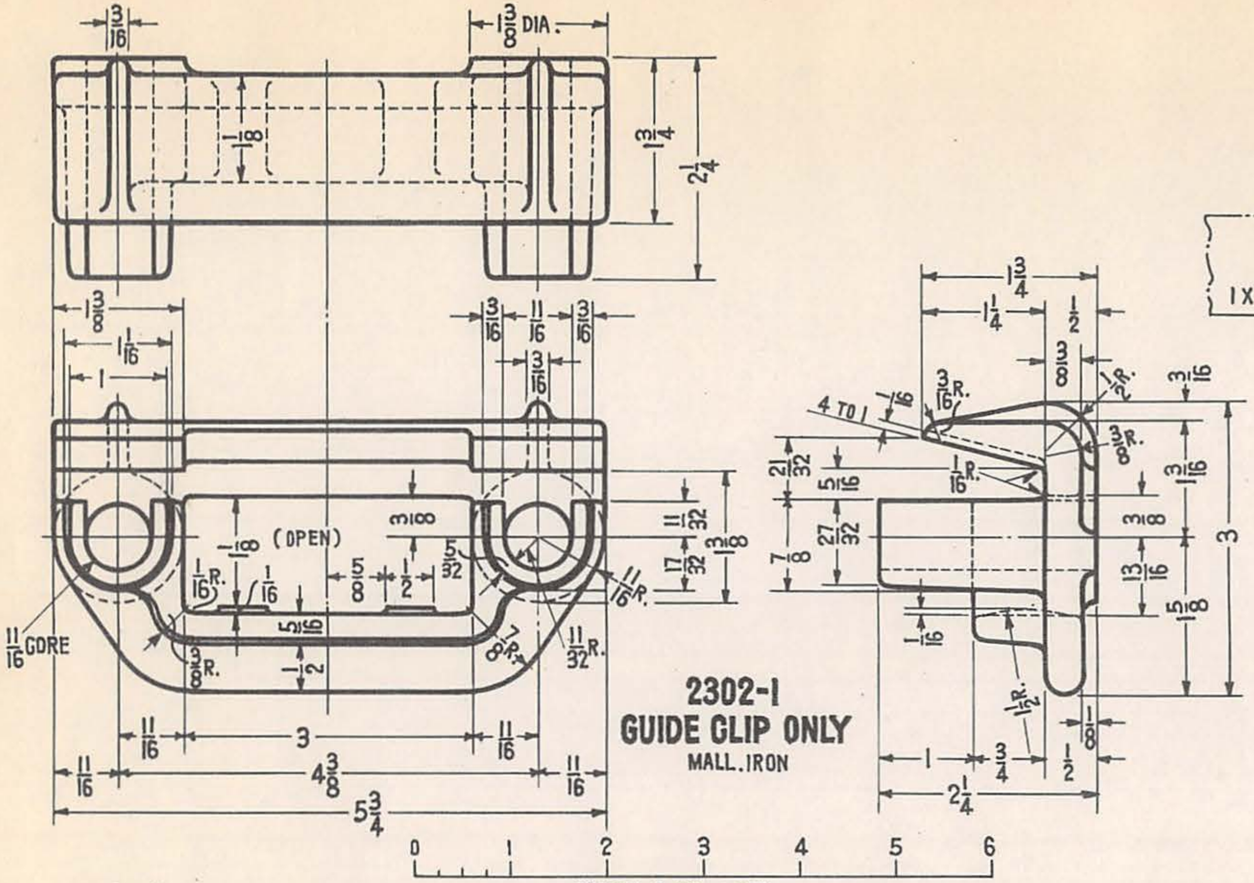
2	9-20-1935

INSULATED JOINT LOCATION
CAR RETARDER LAYOUT

Approved by Representatives of Lines shown.
J C Mock
Chairman.

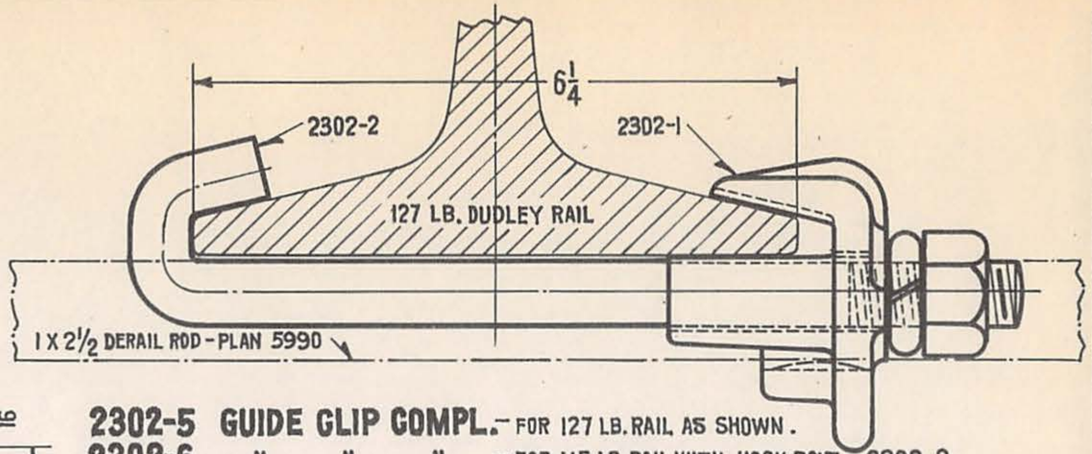
(CONT'D ON PAGE......)



1 3/16
1 3/8 DIA.
1 1/8
1 3/4
2 1/4
1 3/8
1 1/16
1
3/16
11/16
3/16
3/16
(OPEN)
1 1/8
3/8
5/8
1/2
5/32
1/16 R.
1/16
5/16
1/2
3/8 R.
7/8 R.
11/32 R.
11/16 R.
11/32
17/32
1 3/8
11/16 CORE
11/16
3
11/16
4 3/8
5 3/4
1 3/4
1 1/4
1/2
3/8
4 TO 1
1/16
3/16 R.
1/2 R.
3/8 R.
1/16 R.
3/16
1 3/16
2 1/32
5/16
27/32
7/8
3/8
13/16
1 5/8
3
1/16
1/2 R.
1/8
1
3/4
1/2
2 1/4

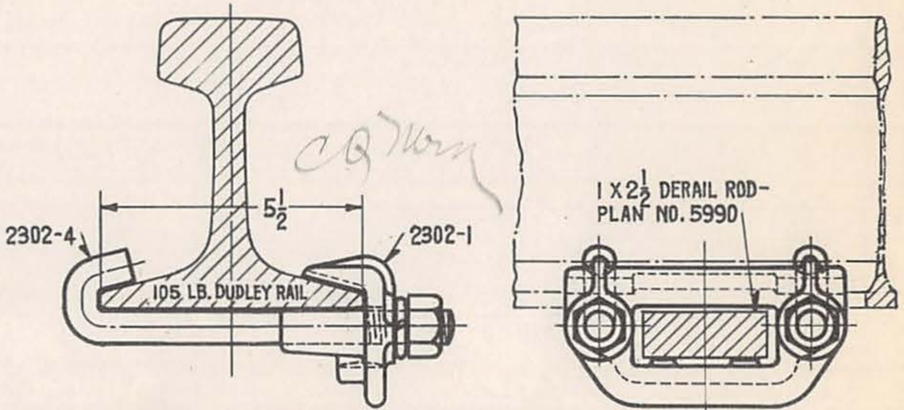
2302-1
GUIDE CLIP ONLY
MALL. IRON

0 1 2 3 4 5 6
SCALE: 6 INS. = 1 FT.



6 1/4
2302-2
2302-1
127 LB. DUDLEY RAIL
1 X 2 1/2 DERAIL ROD - PLAN 5990

2302-5 GUIDE CLIP COMPL. - FOR 127 LB. RAIL AS SHOWN.
2302-6 " " " - FOR 115 LB. RAIL WITH HOOK BOLT - 2302-3

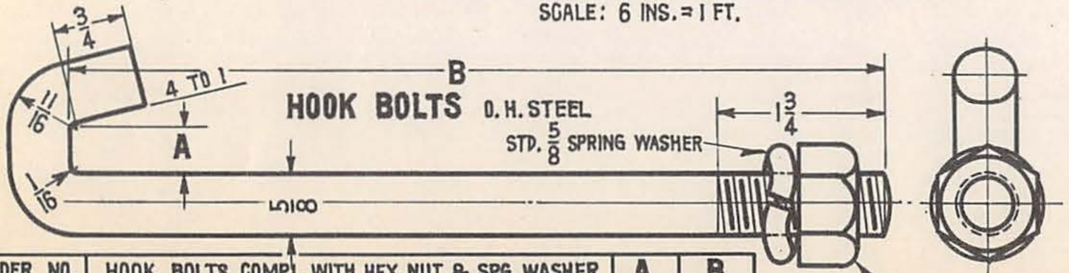


5 1/2
2302-4
2302-1
105 LB. DUDLEY RAIL
1 X 2 1/2 DERAIL ROD - PLAN NO. 5990

CQ Morn

2302-7 GUIDE CLIP COMPL. - FOR 105 LB. DUDLEY AND 100 LB. A.S.C.E. RAIL.

0 1 2 3 4 5 6
SCALE: 3 INS. = 1 FT.



3/4
4 TO 1
B
11/16
A
1/16
5/8
1 3/4
STD. 5/8 SPRING WASHER
STD. HEX. NUT-
5/8 X 11-U.S.S. THD.

HOOK BOLTS O.H. STEEL

ORDER NO.	HOOK BOLTS COMPL. WITH HEX. NUT & SPG. WASHER	A	B
2302-2	FOR 127 LB. DUDLEY RAIL	7/16	8 1/2
2302-3	" 115 LB. " "	7/16	7 1/2
2302-4	" 105 LB. " " AND 100 LB. A.S.C.E. RAIL	11/32	7 1/4

NOTES: ALL DIMENSIONS GIVEN IN INCHES.

WHEN ORDERING PARTS GIVE NUMBER AND NAME SHOWN IN LARGE TYPE OR IN THE TABLE.

SIGNAL NEW YORK CENTRAL LINES COMMITTEE

N.Y.C.R.R.(E).
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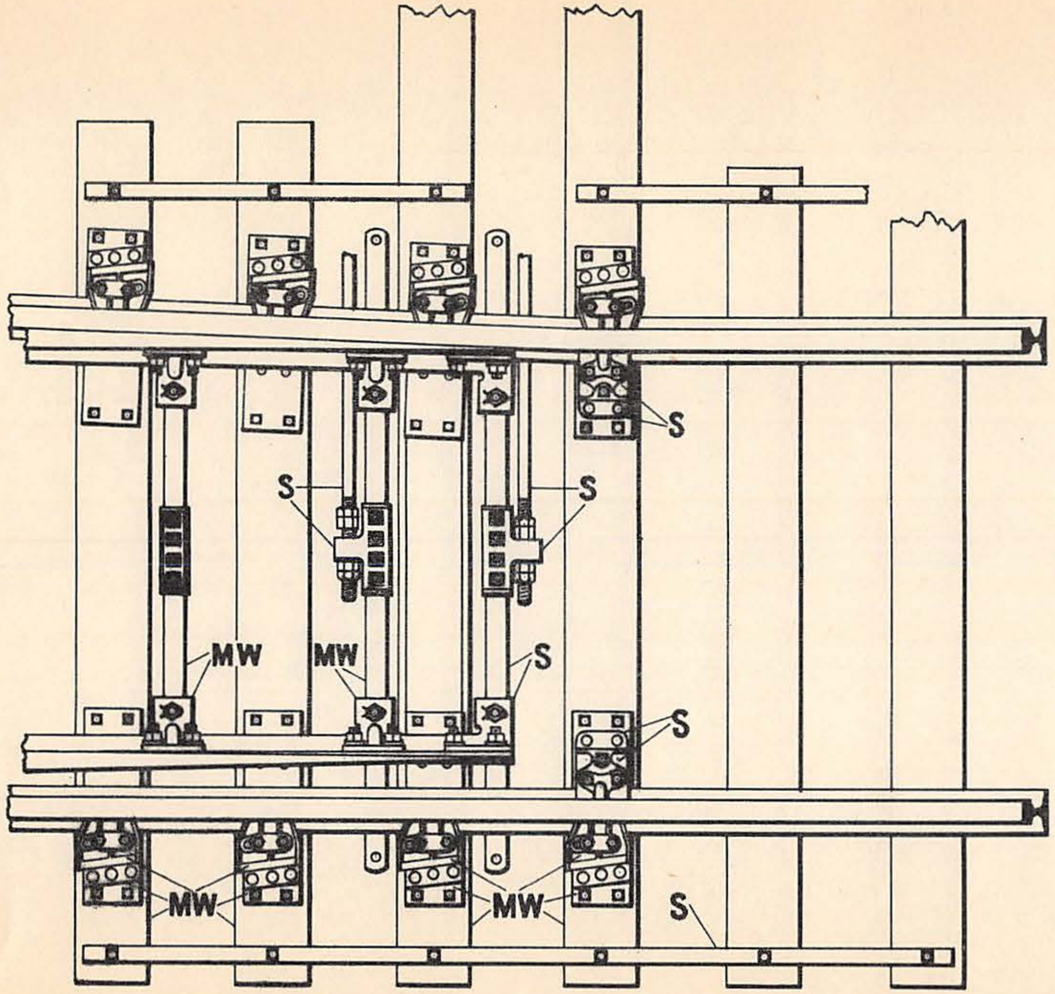
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
P.& L.E.R.R.
RUTLAND R.R.

2302
JULY 9' 1929

GUIDE CLIP

FOR SPLIT POINT DERAIL FRONT & NO.1 RODS

APPROVED BY REPRESENTATIVES OF LINES SHOWN.
J.C. Mock
CHAIRMAN



NOTE:

Parts marked **'MW'** to be furnished and maintained by the Maintenance of Way Department.

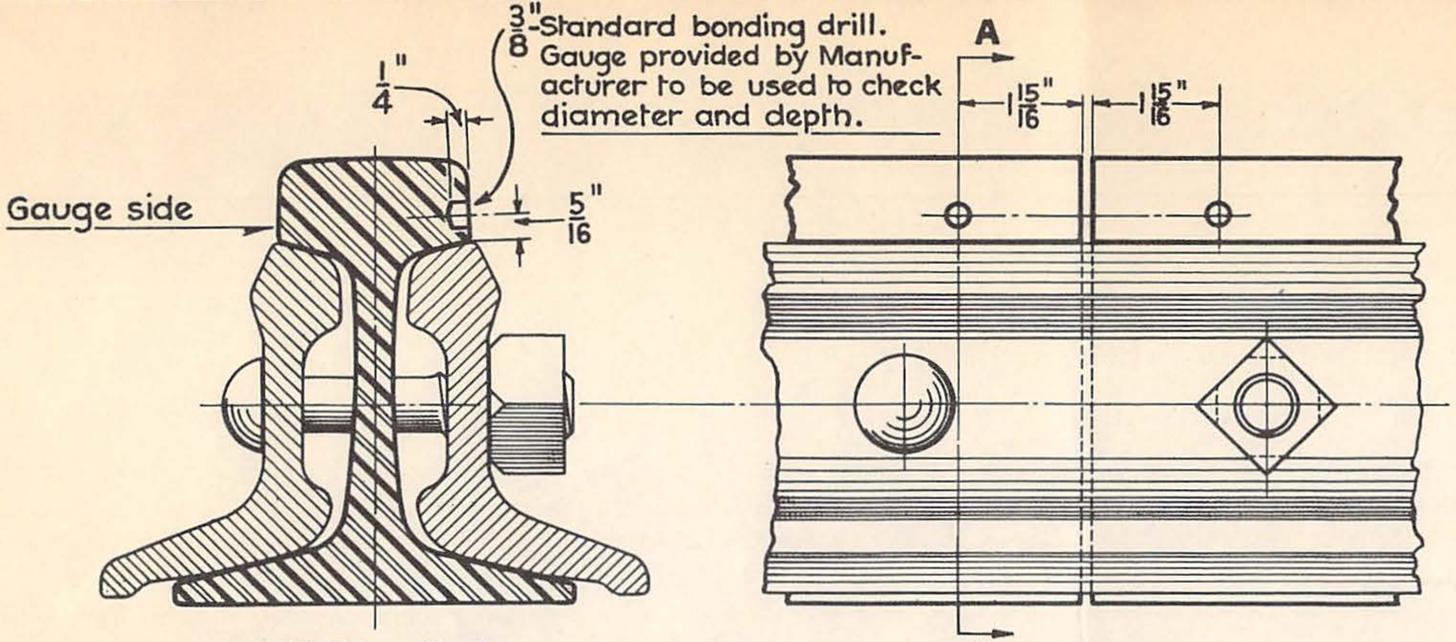
Parts marked **'S'** to be furnished and maintained by the Signal Department.

0 1 2 3 4 5

Scale of Feet

NEW YORK CENTRAL LINES	**SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R.(E). N.Y.C.R.R.(W). N.Y.C.R.R.(OCL). B.& A.R.R. M.C.R.R. C.C.C.& ST L.RY. P. & L.E.R.R. RUTL.R.R.	**2303** ISSUE 1 DATE 2-27-1930
	SINGLE SWITCH **MATERIAL AND MAINTENANCE**	Approved by Representatives of Lines Shown. J.C. Mock Chairman	

WAH



3/8"-Standard bonding drill. Gauge provided by Manufacturer to be used to check diameter and depth.

SECTION A-A

Limitations shown apply to all size rails

INSTRUCTIONS

1. Drill holes dry and remove all chips from the holes.
2. Install bonds the same day holes are drilled.
3. To install bonds, use ordinary 2½ lb. hammer, and strike the pin, or punch where the application of the bond requires the use of a punch, squarely.
4. Three good blows will normally install the terminal. Additional blows should be given if the impact does not sound solid. Excessive pounding should be avoided.
5. Care should be used to see that the bonds, or bond sleeves are parallel to the splice bar.
6. To remove bonds, use an extracting tool as specified in the manufactur's instructions. Place the forked end of the tool under the terminal and give it two or three blows with the hammer until the tool is wedged under the terminal head. Then pry out the terminal by striking the shank of the extracting tool with the hammer.

Scale: 4 in. = 1 ft.

NOTE: Drilling and dimensions based on Engineering Committee plan EC G-25.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R.

2304

ISSUE	DATE
1	3-29-1937

DRILLING FOR RAIL-HEAD-PLUG SIGNAL BOND

Approved by Representatives of Lines shown.

J.C. Mock
Chairman

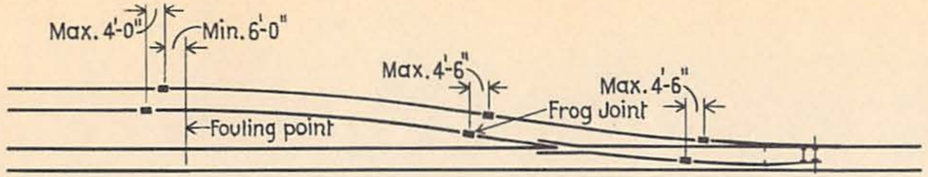

Max. 4'-0"
Min. 6'-0"
Max. 4'-6"
Frog Joint
Max. 4'-6"
Fouling point

FIG. 11
TURNOUT—MAIN TO SIDING
Separate Track Circuit

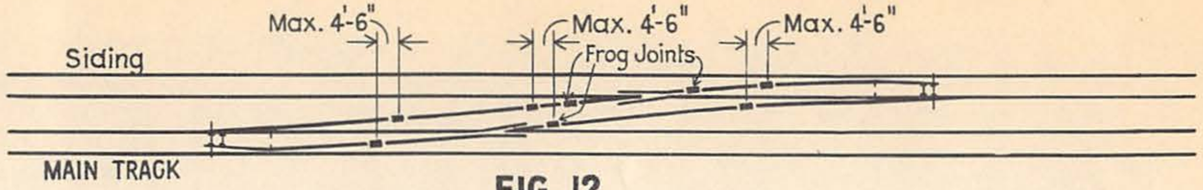

Max. 4'-6"
Max. 4'-6"
Max. 4'-6"
Siding
Frog Joints
MAIN TRACK

FIG. 12
CROSSOVER—MAIN TO SIDING
Separate Track Circuit

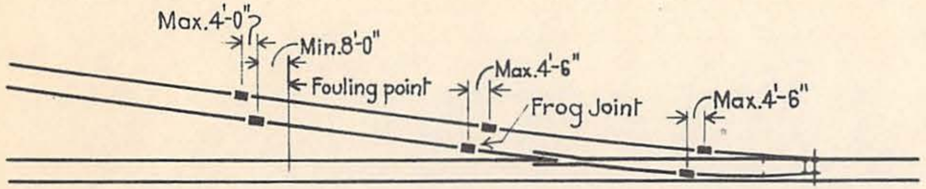

Max. 4'-0"
Min. 8'-0"
Fouling point
Max. 4'-6"
Frog Joint
Max. 4'-6"

FIG. 13
TURNOUT—MAIN TO SIDING OR LEAD
Separate Track Circuit

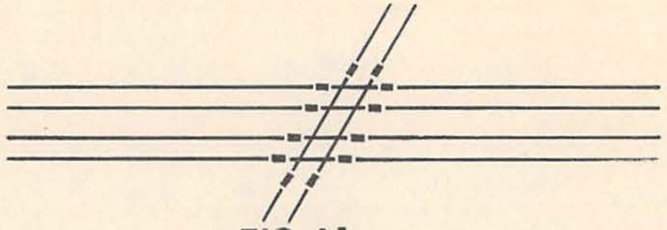


FIG. 14
CROSSING

See Plans 2301-2306

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

LOCATION OF INSULATED JOINTS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

2305

ISSUE	DATE
1	4-14-1930

Approved by Representatives of Lines Shown.
J.C. Mock
Chairman

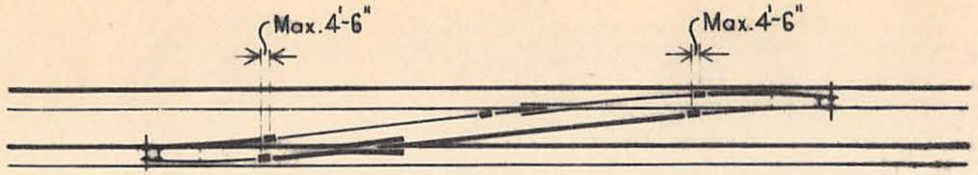


FIG. 15
CROSSOVER—BETWEEN MAIN TRACKS

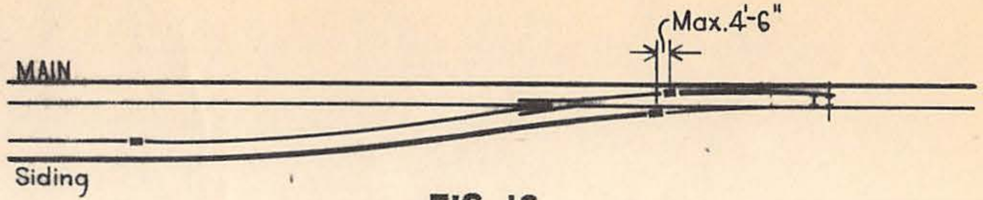


FIG. 16
TURNOUT—MAIN TO SIDING

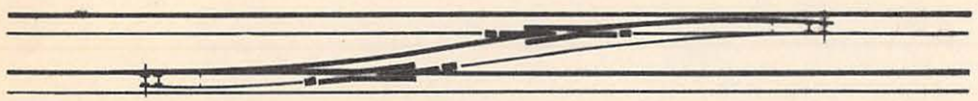


FIG. 17
CROSSOVER—BETWEEN MAIN TRACKS

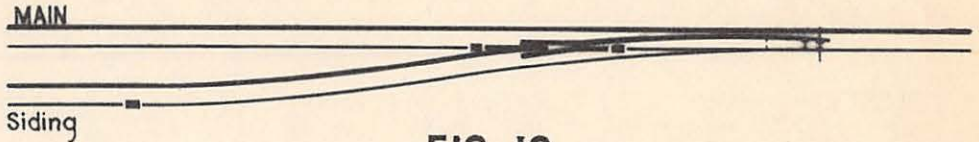


FIG. 18
TURNOUT—MAIN TO SIDING

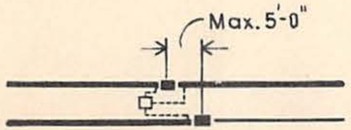


FIG. 19

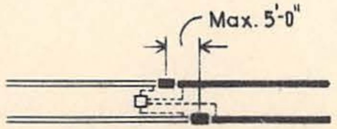


FIG. 20

SINGLE IMPEDANCE BONDS

Single-rail Track Circuit
Abutting Double-rail Track Circuit

Double-rail Track Circuit
Abutting No Track Circuit

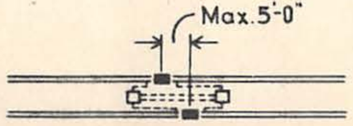


FIG. 21
DOUBLE IMPEDANCE BOND

Double-Rail Track Circuit
Abutting Double-rail Track Circuit

NOTES:

Signal Rail. ———
Propulsion Rail. ━━━
Signal and Propulsion Rail. ═══

See Plans 2301 – 2305

SIGNAL AND TRAIN
CONTROL COMMITTEE

LOCATION OF
INSULATED JOINTS
ELECTRIC OPERATION TERRITORY

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(O.C.L.)
B.&A.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
P.&L.E.R.R.
RUTL.R.R.

2306

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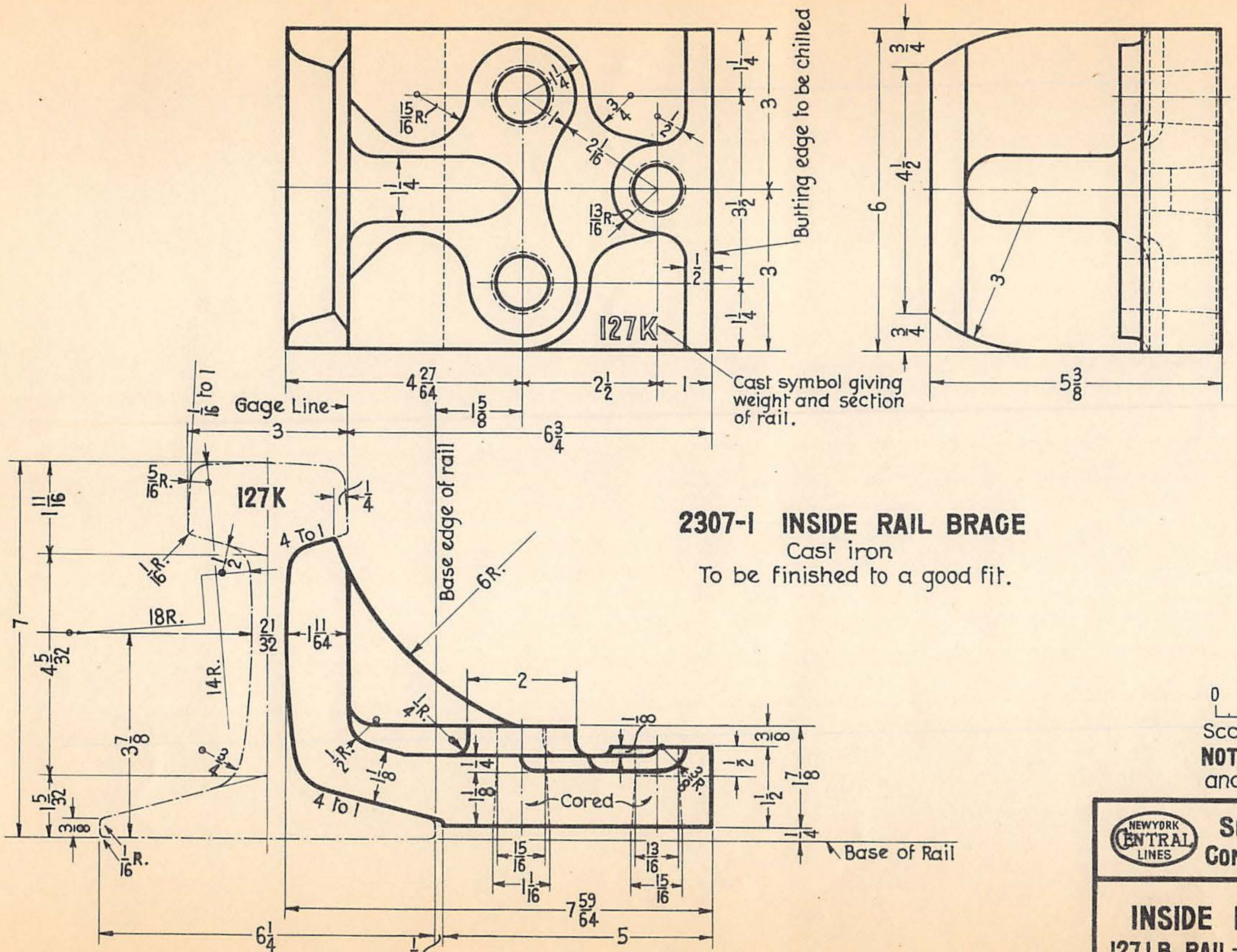
1	4-14-1930

Approved by Representatives of Lines Shown.
J.C. Mock
Chairman


15/16 R.
1 1/4
3/4
1/2
2 1/16
13/16 R.
1 1/4
3
3 1/2
3
1 1/4
1/2
1 1/4
127K
Butting edge to be chilled
3/4
4 1/2
6
3/4
3
5 3/8
4 27/64
2 1/2
1
1 5/8
6 3/4
Cast symbol giving weight and section of rail.
1/16 to 1
Gage Line
3
5/16 R.
127K
1/4
1 11/16
4 To 1
1/16 R.
1/2
18R.
21/32
1 11/64
7
4 5/32
14R.
Base edge of rail
6R.
2
4 1/2 R.
1/8
3/8
1/2 R.
1 1/4
1 1/8
1/2
1 7/8
3 7/8
4 1/8
Cored
3/8 R.
1/2
1 5/32
3/8
1/16 R.
4 to 1
1 1/8
1/4
Base of Rail
15/16
1 1/16
13/16
15/16
7 59/64
6 1/4
1/8
5

2307-1 INSIDE RAIL BRACE

Cast iron
To be finished to a good fit.

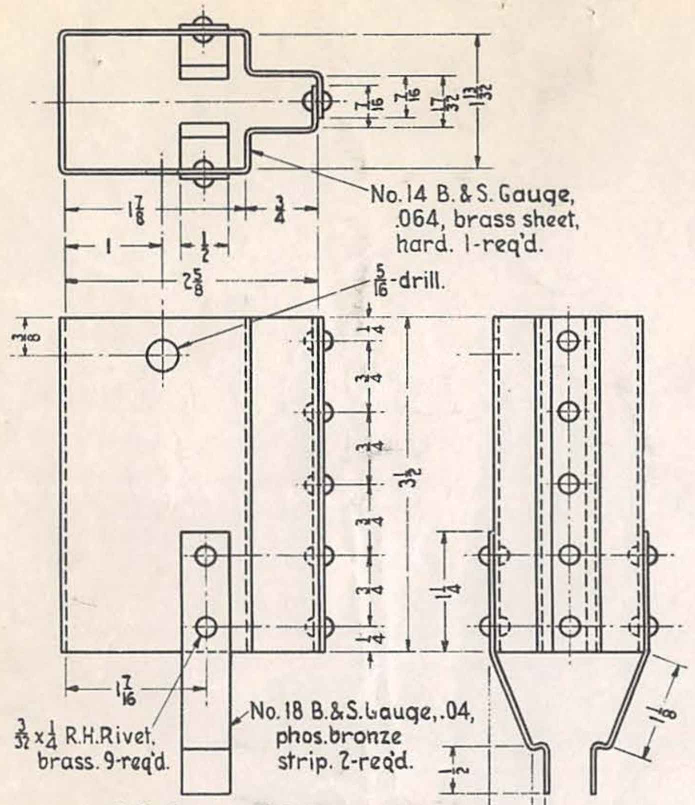
0 1 2 3 4 5 6

Scale and dimensions given in inches

NOTE : When ordering give number and name shown in large type.

NEW YORK CENTRAL LINES	SIGNAL AND TRAIN CONTROL COMMITTEE	N.Y.C.R.R.(E). N.Y.C.R.R.(W). N.Y.C.R.R.(OGL). B.& A.R.R. M.C.R.R. C.C.C.& ST L.RY. P.& L.E.R.R. RUTL.R.R.	2307 ISSUE 1 DATE 3-3-1930
	INSIDE RAIL BRACE 127 LB. RAIL—DUDLEY SECTION	Approved by Representatives of Lines Shown. J.C. Mock Chairman	

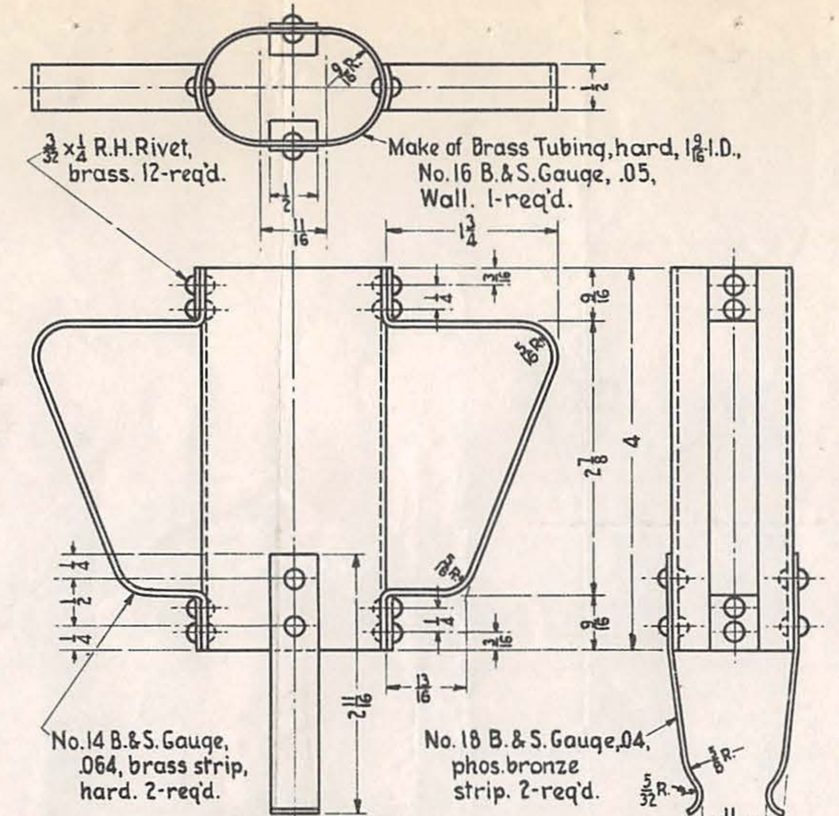
NYC Sig. ERE-2-2A-7C-7/13/35



No. 14 B.&S. Gauge, .064, brass sheet, hard. 1-req'd.
5/16-drill.
3/32 x 1/4 R.H.Rivet, brass. 9-req'd.
No. 18 B.&S. Gauge, .04, phos.bronze strip. 2-req'd.
1 7/8
3/4
1
1/2
2 5/8
3/8
7/16
7/16
17/32
1 13/32
1/4
3/4
3/4
3/4
1/4
3 1/2
1 1/4
1 7/16
1/2
1 1/8
7/16
1/8

2310-1 RED
2310-7 YELLOW

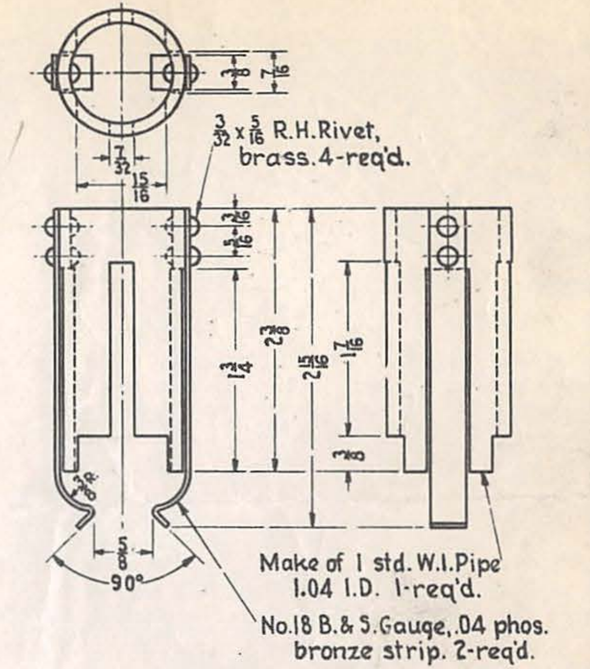
For G.R.S.Co., Model 2 Unit-lever Type Interlocking Machine



3/32 x 1/4 R.H.Rivet, brass. 12-req'd.
Make of Brass Tubing, hard, 1 9/16 I.D., No. 16 B.&S. Gauge, .05, Wall. 1-req'd.
9/16 R.
1/2
1/2
11/16
1 3/4
3/16
1/4
9/16
5/8 R.
2 7/8
4
1/4
1/2
1/4
1/4
1/16 R.
1/4
3/16
9/16
2 11/16
13/16
No. 14 B.&S. Gauge, .064, brass strip, hard. 2-req'd.
No. 18 B.&S. Gauge, .04, phos.bronze strip. 2-req'd.
5/32 R.
5/8 R.
11/16
1

2310-2 RED
2310-8 YELLOW

For G.R.S.Co. — Model 5 Interlocking Machine



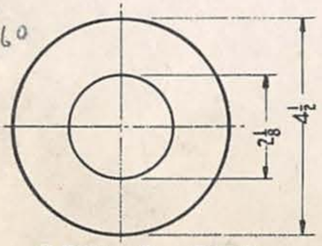
3/8
7/16
7/32
15/16
3/32 x 5/16 R.H.Rivet, brass. 4-req'd.
3/16
5/16
1 3/4
2 3/8
2 15/16
1 7/16
3/8
1/8 R.
5/8
90°
Make of 1 std. W.I.Pipe 1.04 I.D. 1-req'd.
No. 18 B.&S. Gauge, .04 phos. bronze strip. 2-req'd.

2310-3 RED
2310-9 YELLOW

For U.S.&S.Co., Electro-pneu. Interlocking Machine

1/11/33 — 100

10 —
.60



Std. 2 inch plate washer .129 in. thick.

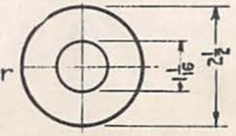
3/16 x 4 1/2

2310-4 RED
2310-10 YELLOW

For Style-A and S.&F. Interlocking Machine

.03
.31

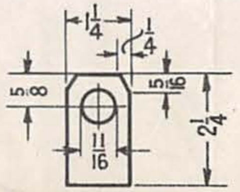
Std. 1 inch plate washer .114 in. thick.



3/16 x 2 1/2

2310-5 RED
2310-11 YELLOW

For G.R.S.Co.- Federal Type Interlocking Machine.



1 1/4
1/4
5/8
5/16
11/16
2 1/4

2310-6 RED
2310-12 YELLOW

For G.R.S. Type-C.T.C. Machine and U.S.&S.Co.-C.T.C. Machine 54000.

Thin Cardboard .015 in. thick.

NOTES: When ordering give number and color of painting required as shown in large type.

Scales: 3 in. and 6 in. = 1 Ft., all dimensions given in inches.

See plan 2311 for Types other than shown above.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

LEVER BLOCKS AND MARKERS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

2310

ISSUE	DATE
1	6-24-1931
2	7-14-1934

APPROVED BY REPRESENTATIVES OF LINES SHOWN.

JCMock CHAIRMAN

S-M2A

55228

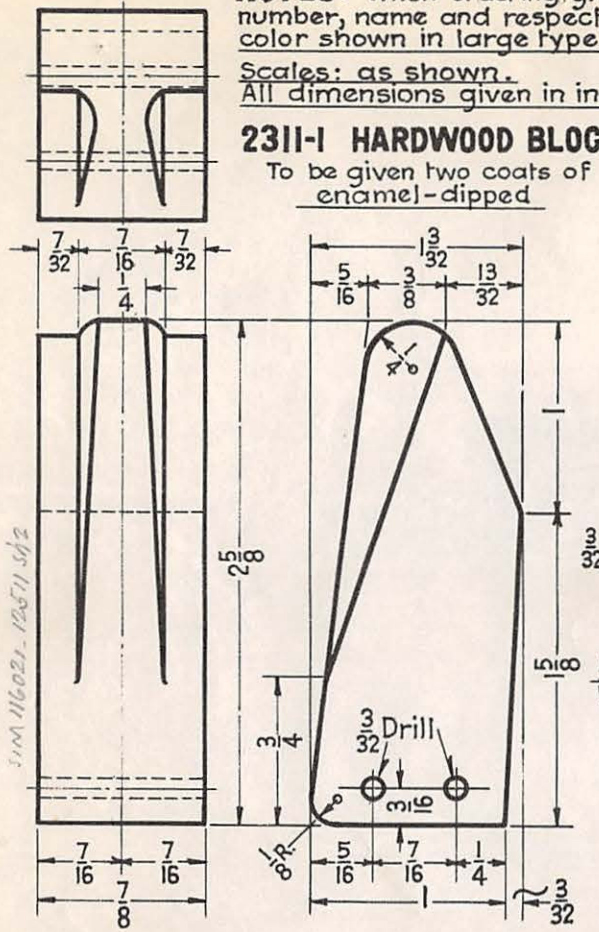
NYC - Sig ERE-2-2A-7C - 3/13/35

NOTES: When ordering give number, name and respective color shown in large type.

Scales: as shown.
All dimensions given in inches

2311-1 HARDWOOD BLOCK

To be given two coats of enamel-dipped



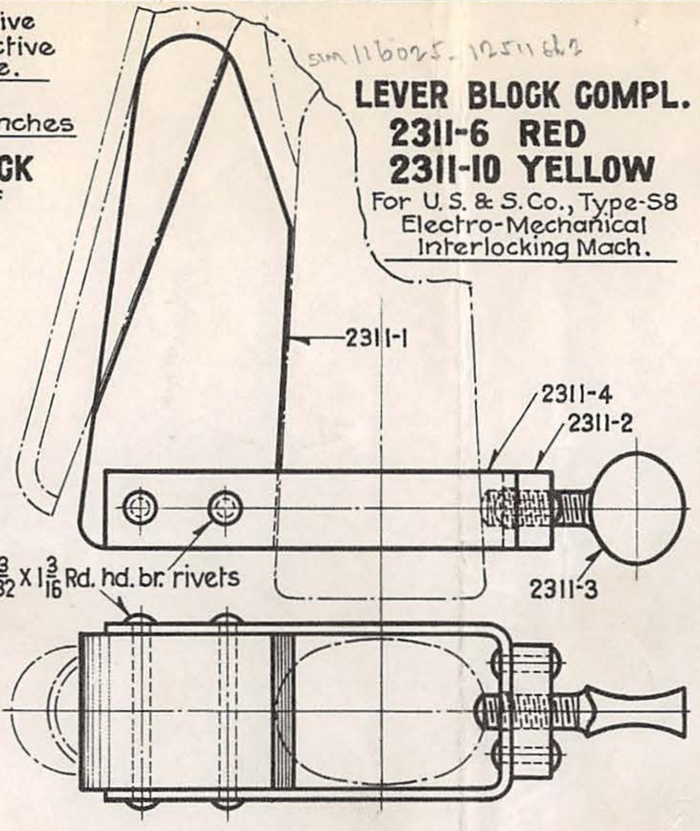
7/32
7/16
7/32
1/4
1 3/32
5/16
3/8
13/32
4"R.
1
2 5/8
1 5/8
3/4
3/32 Drill
3/16
1/8"R.
5/16
7/16
1/4
1
7/16
7/16
7/8
3/32
SIM 116021 - 1251 sh 2

LEVER BLOCK COMPL.

2311-6 RED
2311-10 YELLOW

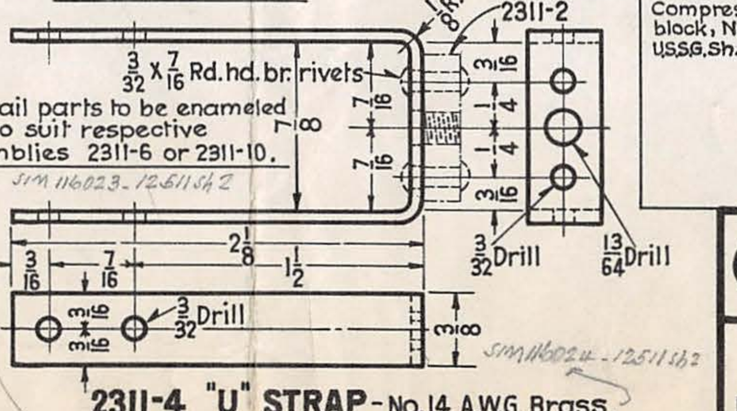
For U.S. & S.Co., Type-S8 Electro-Mechanical Interlocking Mach.

SIM 116025 - 1251 sh 2



2311-1
2311-4
2311-2
2311-3
3/32 x 1 3/16 Rd. hd. br. rivets

Scale: Full Size

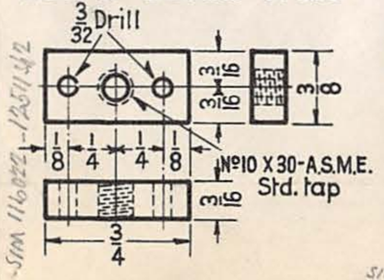


1/8"R.
2311-2
3/32 x 7/16 Rd. hd. br. rivets
7/16
7/8
7/16
3/16
1/4
1/4
3/16
2 1/8
1 1/2
3/16
7/16
3/16
3/16
3/32 Drill
3/8
3/32 Drill
13/64 Drill
SIM 116024 - 1251 sh 2

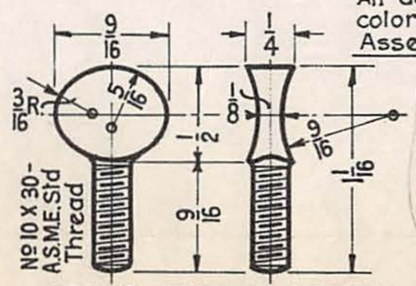
All detail parts to be enameled color to suit respective Assemblies 2311-6 or 2311-10.

SIM 116023 - 1251 sh 2

2311-2 BLOCK - Brass



3/32 Drill
3/16
3/16
3/8
1/8
1/4
1/4
1/8
No10 X 30-A.S.M.E. Std. tap
3/16
3/4
SIM 116022 - 1251 sh 2



9/16
1/4
3/16 R.
5/16
1/8
1/2
9/16
1 1/16
9/16
No 10 X 30-A.S.M.E. Std Thread

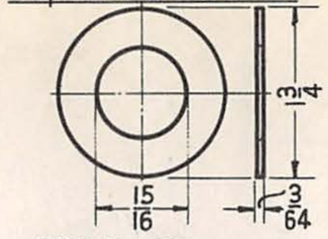
2311-3 THUMB SCREW
Brass

SIM 2767 B8331 sh 1

2311-4 "U" STRAP - No.14 A.W.G. Brass.
2311-5 " " - Assembled with 2311-2

MARKERS

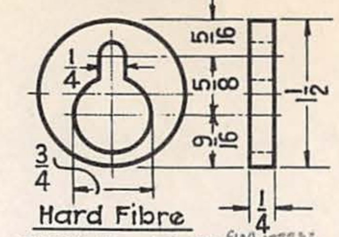
No. 14 Ply Falpaco Railroad Board.



1 3/4
15/16
3/64

2311-7 RED
2311-11 YELLOW

For Rotary Switch U.S.&S.Co.- C.T.C. Mach. 55000.



1/4
5/16
5/8
9/16
1 1/2
3/4
1/4

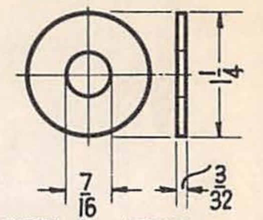
Hard Fibre

SIM 77283 8078 sh 1832

2311-8 RED
2311-12 YELLOW

For C.T.C. Push Button U.S. & S.Co. Machine.

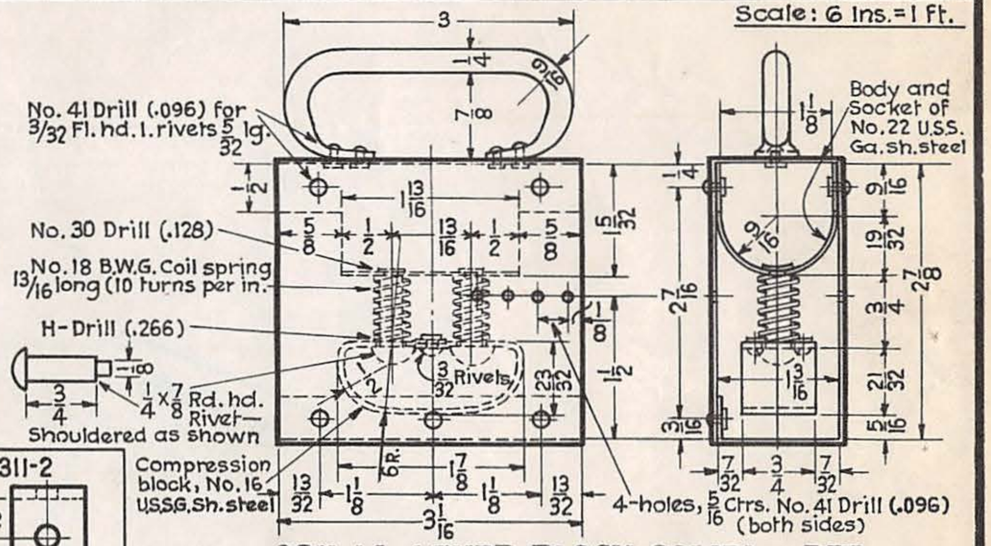
Soft Rubber



2311-9 RED
2311-13 YELLOW

For C.T.C. Signal G.R.S.Co. Machine.

Scale: 6 Ins.=1 Ft.



3
1/4
9/16
7/8
No. 41 Drill (.096) for 3/32 Fl. hd. I. rivets 5/32 lg.
1/2
1 13/16
No. 30 Drill (.128)
5/8
1/2
13/16
1/2
5/8
1 5/32
No. 18 B.W.G. Coil spring 13/16 long (10 turns per in.
H-Drill (.266)
1/8
3/4
1/4 x 7/8 Rd. hd. Rivet— Shouldered as shown
2
3/32 Rivets
23/32
1/8
1 1/2
2 7/16
6R.
Compression block, No. 16 U.S.S.G. Sh. steel
13/32
1 1/8
1 7/8
1 1/8
13/32
3 1/16
4-holes, 5/16 Ctrs. No. 41 Drill (.096) (both sides)
1 1/8
Body and Socket of No. 22 U.S.S. Ga. sh. steel
1/4
9/16
9/16
19/32
2 7/8
3/4
1 3/16
21/32
3/16
5/16
7/32
3/4
7/32

2311-14 LEVER BLOCK COMPL. — RED
2311-15 " " " — YELLOW

For G.R.S. Co., Model 2 Electric Interlocking Machine.

See Plan 2310 for Types other than shown above.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& St L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2311

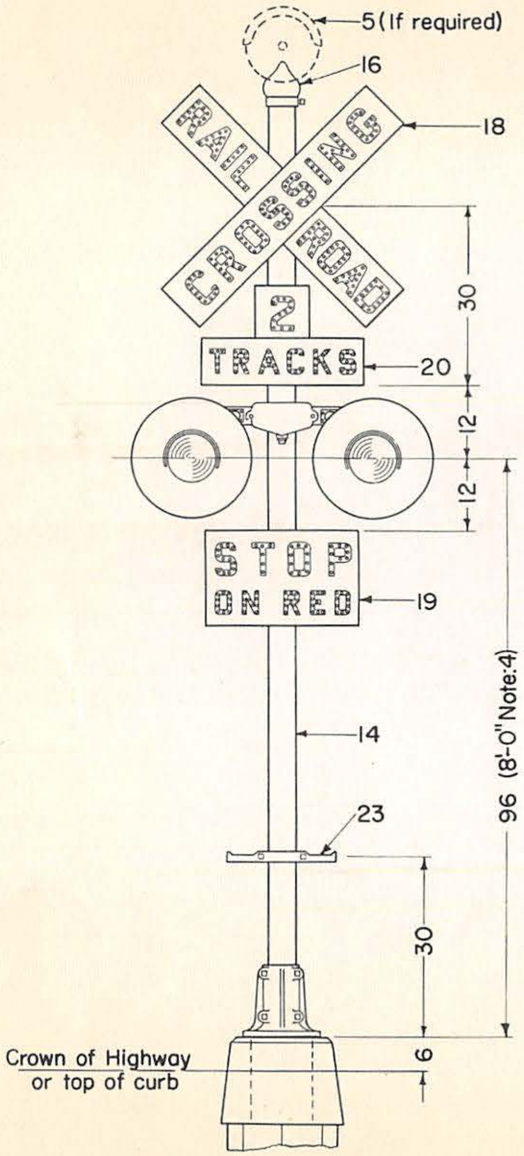
ISSUE	DATE
1	10-30-1931
2	7-14-1934

LEVER BLOCKS AND MARKERS

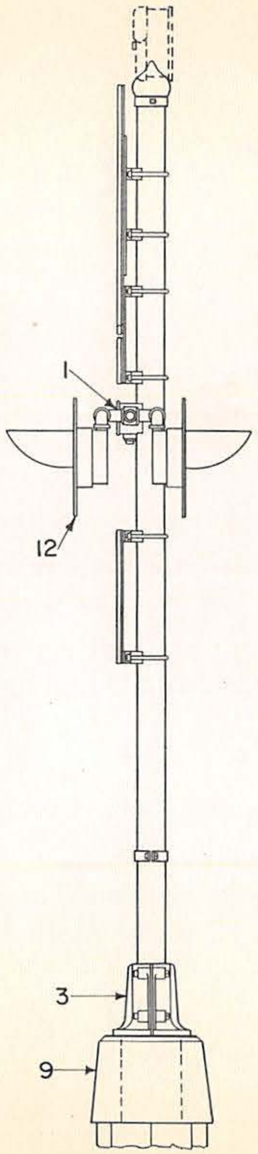
Approved by Representatives of Lines Shown.
J C Mock
Chairman

WAH

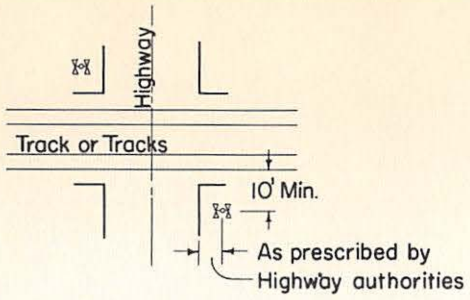
S-M2B


5 (If required)
16
18
RAILROAD CROSSING
2
TRACKS
20
30
12
12
STOP ON RED
19
96 (8'-0" Note:4)
14
23
30
6
Crown of Highway or top of curb

FRONT ELEVATION



SIDE ELEVATION


Highway
Track or Tracks
10' Min.
As prescribed by Highway authorities

TYPICAL LOCATION

NOTES:

1. The number of tracks shown on the "TRACKS" sign shall be the total number of tracks lying between the flashing light signals.
2. This plan is typical for part references. These may be varied when authorized by Chief Signal Engineer.
3. Signs, of the "Bead reflectorized" type may be used on other than State Trunkline highways when approved by County Road Commission.
4. May be varied by Highway authorities to fit grade conditions.

PAINTING

5. Mast, pinnacle, base, crossarm, bell and pole steps — Aluminum, Item No. 53, Instruction 350.
6. Lamp cases, lamp hoods and circular backgrounds — Flat Black, Item No. 46, Instruction 350.

0 12 24 36 48 60

All dimensions given in inches unless otherwise indicated.

NO.	ITEM	REF.	REQ.
1	Arm, cross (4 way) compl.	AAR 16565	1
2			
3	Base, split	AAR 14492	1
4			
5	Bell (as required)	W.R.S.Co.Type 222 Pl.B5, Ref. 3L	1
6			
7			
8			
9	Foundation, precast	Permacrete S-1	1
10			
11			
12	Lamp, flashing light unit	760	4
13			
14	Mast, 4 in	2656-1	1
15			
16	Pinnacle	2313-2	1
17			
18	Sign, Crossing (4 in. pipe) compl.	See Note: 3	1
19	" , Stop (" " ") "	" " "	1
20	" , Track (" " ") "	" " "	1
21			
22			
23	Step, double	2655-1	1
24			
25			

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT

HIGHWAY CROSSING SIGNAL
FLASHING LIGHT TYPE

MICHIGAN

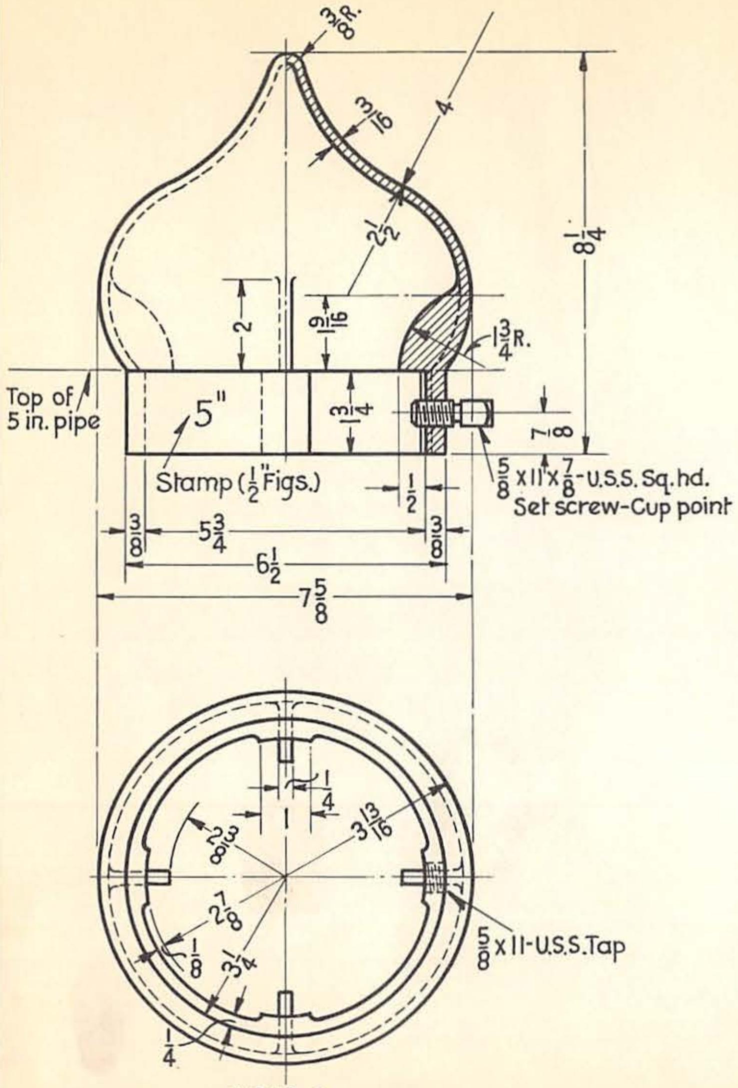
Approved J J Corcoran
Chief Signal Engineer

S-2312

Printed in U.S.A.

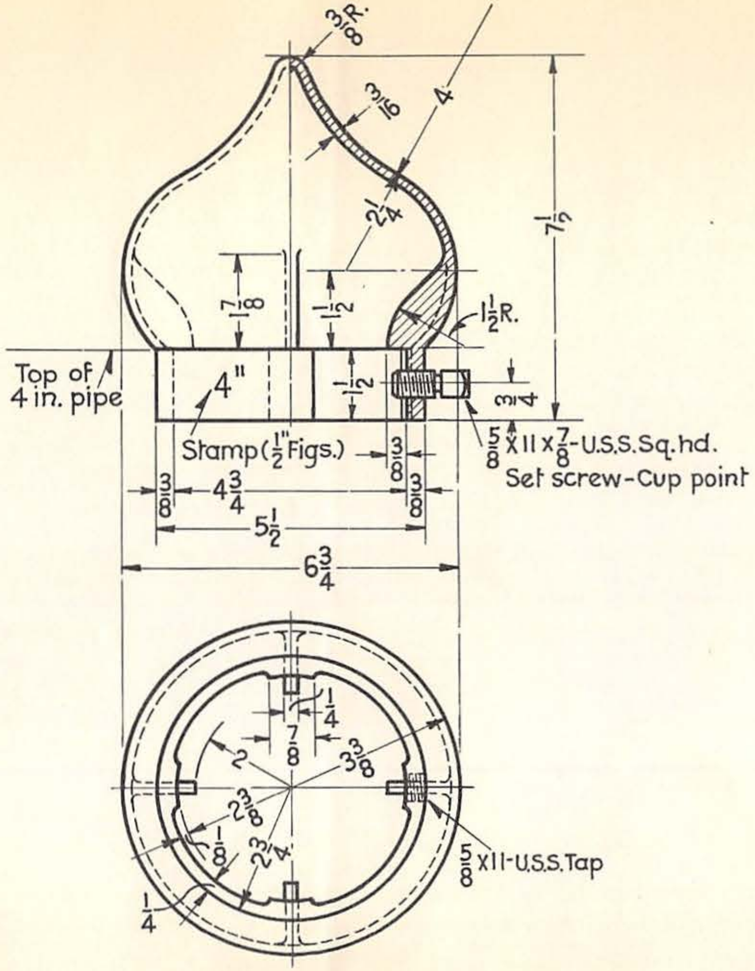
ISSUED 6-1-54

RECEIVED
JUL 19 1954
CUSTOMER
SERVICES
DEPT.
ORD. SECT.

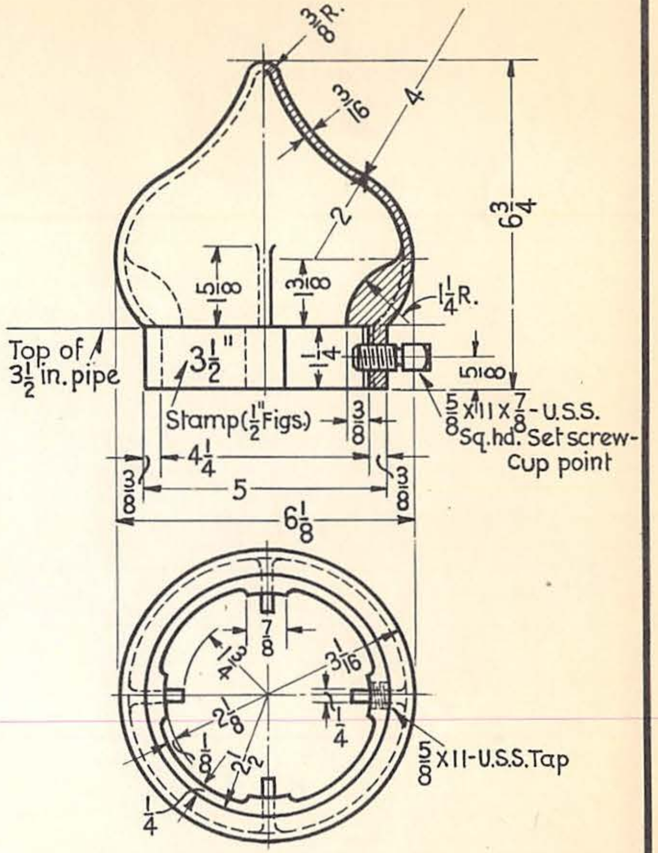


3/8 R.
3/16
4
2 1/2
8 1/4
2
9/16
1 3/4 R.
Top of 5 in. pipe
5"
1 3/4
7/8
5/8 x 11 x 7/8 - U.S.S. Sq. hd. Set screw-Cup point
Stamp (1/2" Figs.)
1/2
3/8
5 3/4
3/8
6 1/2
7 5/8
1
1/4
2 3/8
3 13/16
2 7/8
1/8
3 1/4
1/4
5/8 x 11-U.S.S. Tap

2313-1
FOR 5 IN. PIPE POST
G. I.



3/8 R.
3/16
4
2 1/4
7 1/2
1 7/8
1 1/2
1 1/2 R.
Top of 4 in. pipe
4"
1 1/2
3/4
5/8 x 11 x 7/8 - U.S.S. Sq. hd. Set screw-Cup point
Stamp (1/2" Figs.)
3/8
3/8
4 3/4
3/8
5 1/2
6 3/4
1/4
7/8
2
3 3/8
2 3/8
1/8
2 3/4
1/4
5/8 x 11-U.S.S. Tap



3/8 R.
3/16
4
2
6 3/4
1 5/8
1 3/8
1 1/4 R.
Top of 3 1/2 in. pipe
3 1/2"
1 1/4
5/8
5/8 x 11 x 7/8 - U.S.S. Sq. hd. Set screw-Cup point
Stamp (1/2" Figs.)
3/8
3/8
4 1/4
5
3/8
6 1/8
7/8
1 13/16
3 1/16
1/4
2 1/8
1/8
2 1/2
1/4
5/8 x 11-U.S.S. Tap

2313-3
FOR 3 1/2 IN. PIPE POST
G. I.

2313-2
FOR 4 IN. PIPE POST
G. I.

0 1 2 3 6 9
Scale and dimensions in inches

NOTE: When ordering give Reference Number shown in large type.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

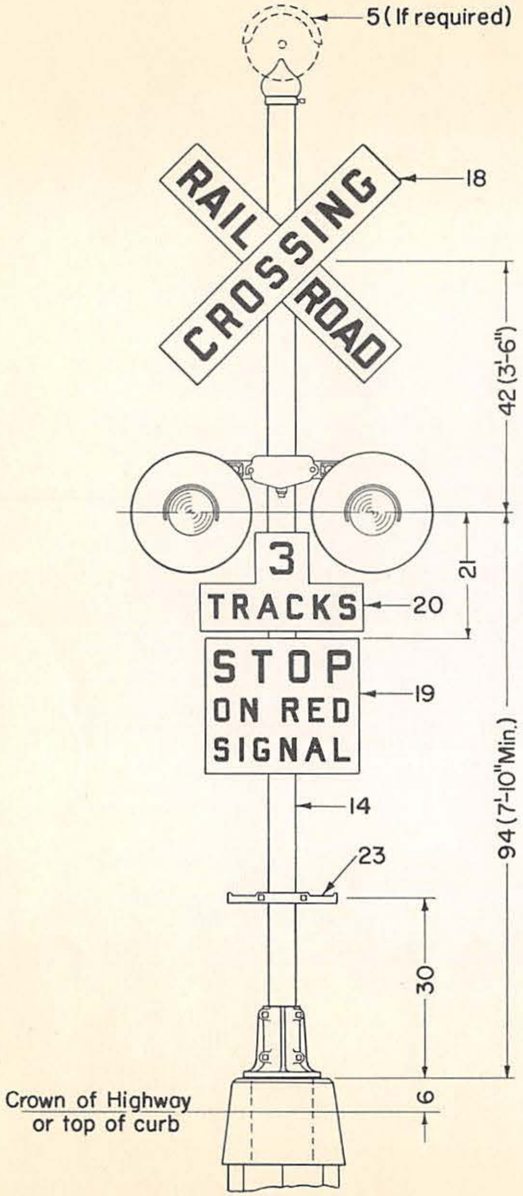
N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL)
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTLAND R.R.

2313	
ISSUE	DATE
1	6-24-1931

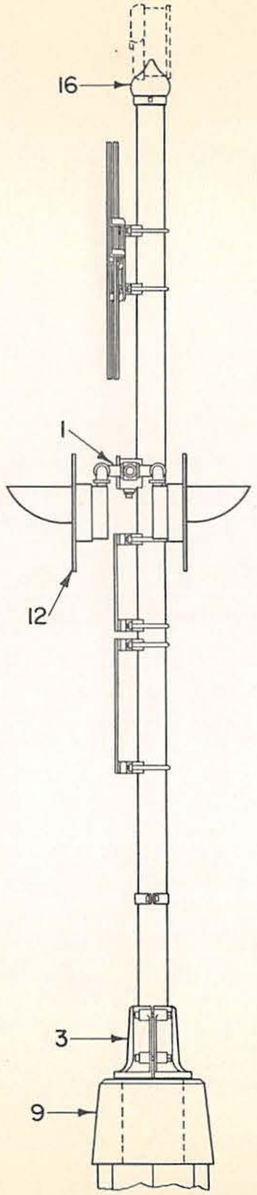
PINNACLES

Approved by Representatives of Lines shown.
J C Mock
Chairman

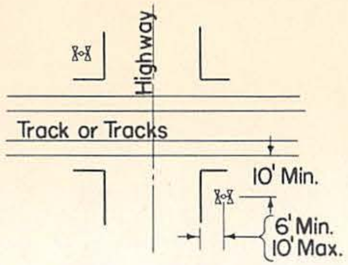
WAH


5 (If required)
18
RAIL ROAD
CROSSING
42 (3'-6")
3
TRACKS
20
21
STOP
ON RED
SIGNAL
19
14
23
94 (7'-10" Min.)
30
6
Crown of Highway
or top of curb

FRONT ELEVATION



SIDE ELEVATION


Highway
Track or Tracks
10' Min.
6' Min.
10' Max.

TYPICAL LOCATION

NOTES:

1. Track sign required only at crossing with two or more tracks. The number of tracks shown on the "TRACKS" sign shall be the total number of tracks lying between the flashing light signals.
2. Acute angle crossing locations shall be in accordance with TABLE OF DISTANCE, issued by U.S. Bureau of Public Roads, Division of Design, January 1939.
3. This plan is typical for part references. These may be varied when authorized by Chief Signal Engineer.

PAINTING

4. Mast, pinnacle, base, crossarm, bell and pole steps — Aluminum, Item No. 53, Instruction 350.
5. Lamp cases, lamp hoods and circular backgrounds - Flat Black, Item No. 46 Instruction 350.

0 12 24 36 48 60

All dimensions given in inches unless otherwise indicated

NO.	ITEM	REF.	REQ.
1	Arm, cross (4 way) compl.	AAR 16565	1
2			
3	Base, split	AAR 14492	1
4			
5	Bell (as required)	W.R.S.Co.Type 222 Pl. B5, Ref. 3L	1
6			
7			
8			
9	Foundation, precast	Permacrete S-1	1
10			
11			
12	Lamp, flashing light unit.	760	4
13			
14	Mast, 4 in.	2656-1	1
15			
16	Pinnacle	2313-2	1
17			1
18	Sign, Crossing (4 in. pipe) compl. Reflex-reflecting material	AAR 17171	1
19	Sign, Stop (4 in. pipe) compl. Reflex-reflecting material	AAR 17201	1
20	Sign, Track (4 in. pipe) compl. Reflex-reflecting material	AAR 17191	1
21			
22			
23	Step, double	2655-1	1
24			
25			

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
FLASHING LIGHT TYPE
INDIANA

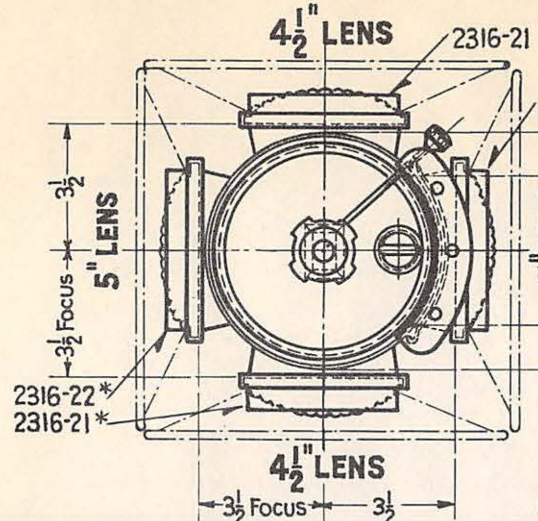
Approved
Chief Signal Engineer

S-2314

ISSUED 6-1-54

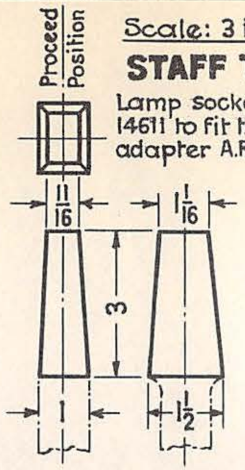
Printed in U.S.A.

RECEIVED
JUL 19 1954
CUSTOMER
SERVICES
DEPT.
ORD. SECT.



$4\frac{1}{2}$" LENS
2316-21
2316-22
$3\frac{1}{2}$
5" LENS
$3\frac{1}{2}$ Focus
5" LENS
$4\frac{5}{16}$ Doorway
$6\frac{1}{2}$ Diam. of body
2316-22*
2316-21*
$4\frac{1}{2}$" LENS
$3\frac{1}{2}$ Focus
$3\frac{1}{2}$

Narrow-way of base socket A.R.A.14611 assembled parallel with center line.



Proceed Position
$\frac{11}{16}$
$1\frac{1}{16}$
3
1
$1\frac{1}{2}$

Scale: 3 ins.= 1 Ft.

STAFF TIP

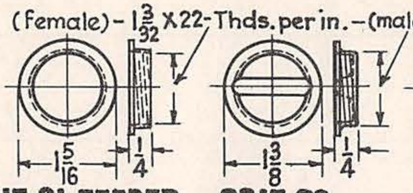
Lamp socket A.R.A. No. 14611 to fit this tip or adapter A.R.A. 14591

FOR ORDERING SPREADLITE LENS AND DISC COMBINATIONS FOR SWITCH LAMP 2315

(Specify **2315** if Lamp is required.)

LENS COMBINATIONS			DISC COMBINATIONS			LENS & DISC COMBINATIONS		
ORDER NO.	2-EACH REQUIRED		ORDER NO.	2-EACH REQUIRED		ORDER NO.	WITH LENSES	WITH DISCS
2315-20	Green 2315-1	Red 2315-4	**2315-21**	Green 2315-7	Red 2315-10	**2315-26**	2315-20	2315-21
2315-22	LunarWhite 2315-2	Yellow 2315-5	**2315-23**	White 2315-8	Yellow 2315-11	**2315-27**	2315-22	2315-23
2315-24	Yellow 2315-3	Purple 2315-6	**2315-25**	Yellow 2315-9	Red 2315-10	**2315-28**	2315-24	2315-25

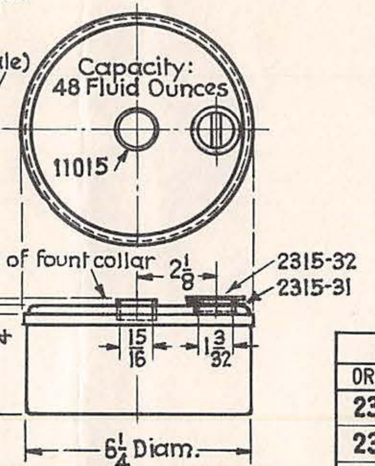
Long-time Burning Chimneys shall be in accordance with Specifications-33.
Long-time Burning Oil shall be in accordance with Specifications-90.



(female) - $1\frac{3}{32}$ X 22-Thds. per in. - (male)
$1\frac{5}{16}$
$\frac{1}{4}$
$1\frac{3}{8}$
$\frac{1}{4}$

2315-31 FEEDER COLLAR **2315-32 FEEDER CAP**

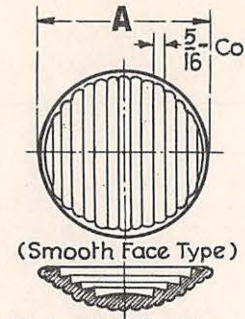
Brass-No. 20 A.W.G.
Scale: $\frac{3}{8}$ in.= 1 in.



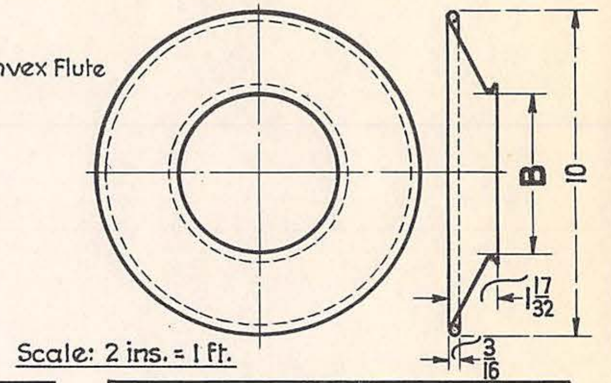
Capacity: 48 Fluid Ounces
11015
Top of fount collar
$2\frac{1}{8}$
2315-32
2315-31
$\frac{1}{8}$
$\frac{1}{4}$
$\frac{15}{16}$
$1\frac{3}{32}$
$3\frac{1}{16}$
$2\frac{15}{16}$
$6\frac{1}{4}$ Diam.

2315-30 OIL FOUNT

Fount shall be made of No. 22 U.S.S.G. drawn steel, tinned, and body shall be pressed out of one piece with top soldered on. Scale: $\frac{3}{16}$ in.= 1 in.



A
$\frac{5}{16}$
Convex Flute
(Smooth Face Type)
Horizontal Section



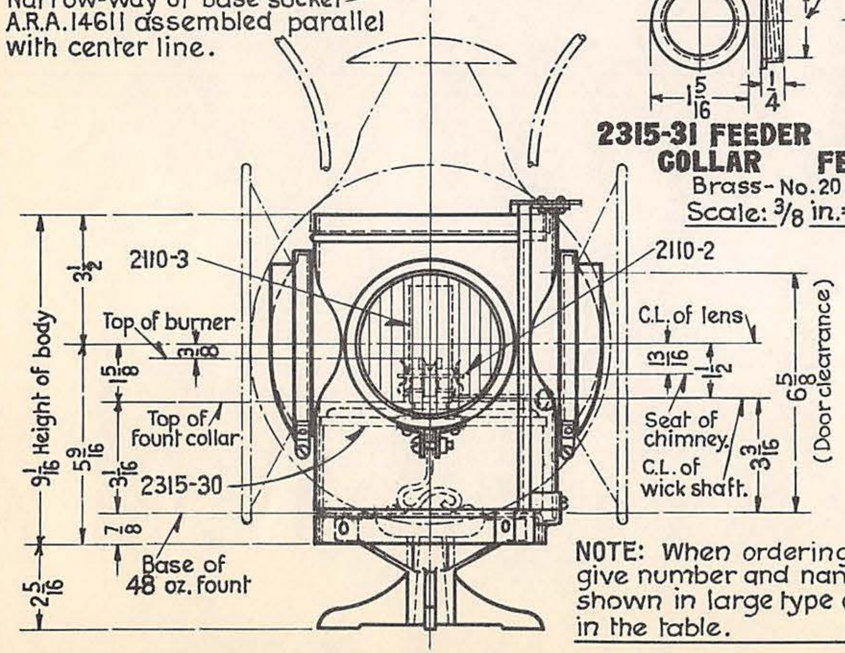
B
10
$1\frac{17}{32}$
$\frac{3}{16}$

Scale: 2 ins. = 1 Ft.

SPREADLITE LENSES		
ORDER NO.	COLOR	A = INS.
2315-1	Green	$4\frac{1}{2}$
2315-2	LunarWhite	$4\frac{1}{2}$
2315-3	Yellow	$4\frac{1}{2}$
2315-4	Red	5
2315-5	Yellow	5
2315-6	Purple	5

DISCS			
ORDER NO.	COLOR	B = INS.	FOR
2315-7	Green	$4\frac{1}{4}$	$4\frac{1}{2}$" Lens
2315-8	White	$4\frac{1}{4}$	
2315-9	Yellow	$4\frac{1}{4}$	
2315-10	Red	$4\frac{3}{4}$	5" Lens
2315-11	Yellow	$4\frac{3}{4}$	

All dimensions given in inches



$3\frac{1}{2}$
2110-3
2110-2
Top of burner
$\frac{3}{8}$
$1\frac{5}{8}$
$9\frac{1}{16}$ Height of body
$5\frac{9}{16}$
Top of fount collar
$3\frac{1}{16}$
2315-30
$\frac{7}{8}$
Base of 48 oz. fount
$2\frac{5}{16}$
C.L. of lens
$\frac{13}{16}$
$1\frac{1}{2}$
Seat of chimney
C.L. of wick shaft
$3\frac{3}{16}$
$6\frac{5}{8}$ (Door clearance)

NOTE: When ordering give number and name shown in large type or in the table.

2315 SWITCH LAMP COMPL.- Except Lenses and Discs.

(See Table for Spreadlite Lens and Disc Combinations)
Scale: $\frac{3}{16}$ in.= 1 in.

NOTES: * Lens hood combinations 2316-21 and 2316-22 are shown as standard equipment; substitute combinations 2316-24 and 2316-25 for applying round type target discs.

Lamp 2315 like ARA-1460B except oil fount, size of lenses and clearance height of door.

N.Y.C. Lines standard burner 2110-2, wick, and chimney 2110-3 to be furnished unless otherwise specified. See plans 2110 and 2316 for details of lamp parts.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2315

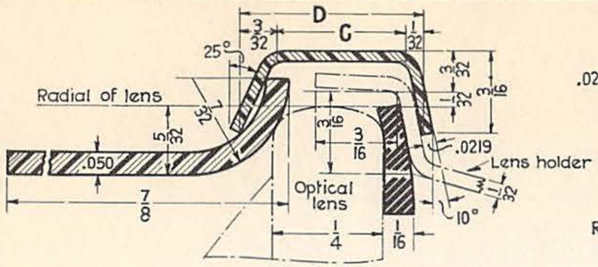
ISSUE	DATE
1	5-15-1931
2	6-29-1933
3	1-12-1935

OIL SWITCH LAMP

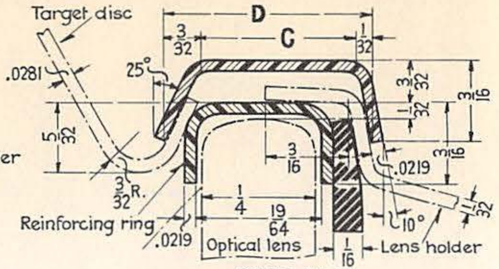
(48 Oz. Fount)

Approved by Representatives of Lines shown.
J.C. Morse
Chairman

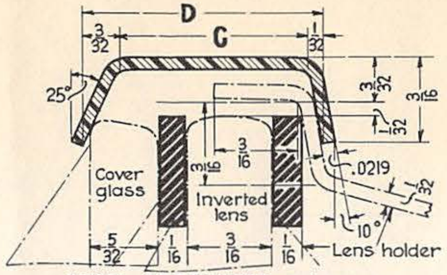
WAH


D
C
3/32
1/32
25°
Radial of lens
.050
5/32
7/8
3/16
.0219
Lens holder
Optical lens
1/4
1/16
10°

SECT. X-X

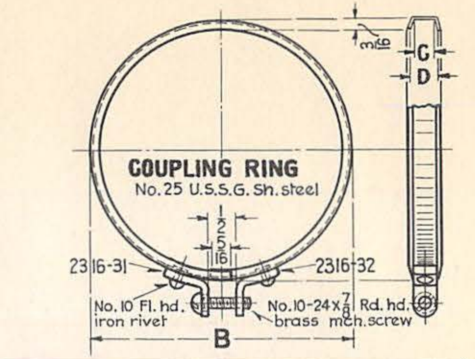

Target disc
D
C
3/32
1/32
.0281
25°
3/16
3/32 R.
Reinforcing ring
.0219
1/4
19/64
Optical lens
1/16
Lens holder
10°

SECT. Y-Y

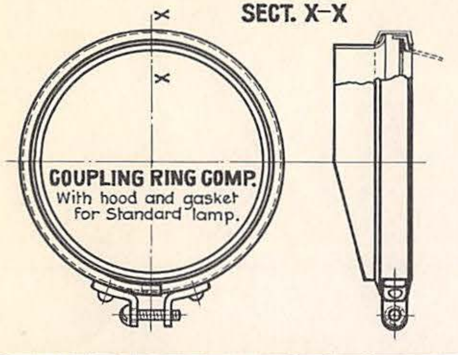

D
C
3/32
1/32
25°
Cover glass
Inverted lens
3/16
.0219
5/32
1/16
10°
Lens holder

SECT.-ASSEMBLY-Tail lamps

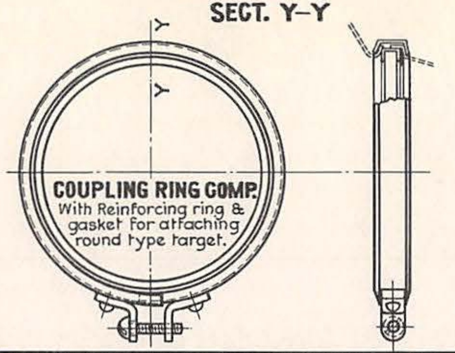
COUPLING RING COMPL.-With Gaskets only				
ORD. NO.	LENS DIA.	COUP. RING	GASKET	FOR TAIL LAMPS
2316-27	$5\frac{3}{8}$	2316-10	2316-19	With Optical Lens. (See Sect. below)
2316-28	$6\frac{3}{8}$	2316-11	2316-20	
2316-29	$5\frac{3}{8}$	2316-12	2316-19	With Inverted Lens and Cover Glass. (See Sect. above)
2316-30	$6\frac{3}{8}$	2316-13	2316-20	


COUPLING RING
No. 25 U.S.S.G. Sh. steel
3/16
C
D
1/2
5/16
2316-31
2316-32
No. 10 Fl. hd. iron rivet
No. 10-24 x 7/8 Rd. hd. brass mch. screw
B

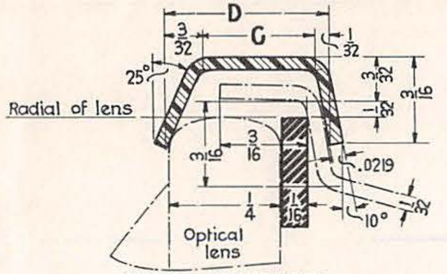
ORD. NO.	LENS DIA.	B	C	D	FOR
2316-4	$4\frac{1}{2}$	$4\frac{3}{4}$	$\frac{5}{16}$	$\frac{7}{16}$	Switch and Semaphore lamps with lens hood.
2316-5	5	$5\frac{1}{4}$	$\frac{5}{16}$	$\frac{7}{16}$	
2316-6	$5\frac{3}{8}$	$5\frac{5}{8}$	$\frac{5}{16}$	$\frac{7}{16}$	
2316-7	$4\frac{1}{2}$	$4\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	Switch lamps with Round Type Target Discs.
2316-8	5	$5\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	
2316-9	$5\frac{3}{8}$	$5\frac{5}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	
2316-10	$5\frac{3}{8}$	$5\frac{5}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	TAIL LAMPS With Optical Lens.
2316-11	$6\frac{3}{8}$	$6\frac{5}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	
2316-12	$5\frac{3}{8}$	$5\frac{5}{8}$	$\frac{7}{16}$	$\frac{9}{16}$	With Inverted Lens and Cover Glass.
2316-13	$6\frac{3}{8}$	$6\frac{5}{8}$	$\frac{7}{16}$	$\frac{9}{16}$	


X
X
COUPLING RING COMP.
With hood and gasket for Standard lamp.

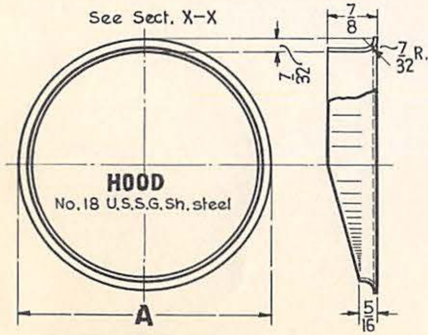
ORD. NO.	LENS DIA.	HOOD	COUP. RING	GASKET	FOR
2316-21	$4\frac{1}{2}$	2316-1	2316-4	2316-17	Standard Switch and Semaphore Lamps with Lens Hoods.
2316-22	5	2316-2	2316-5	2316-18	
2316-23	$5\frac{3}{8}$	2316-3	2316-6	2316-19	


Y
Y
COUPLING RING COMP.
With Reinforcing ring & gasket for attaching round type target.

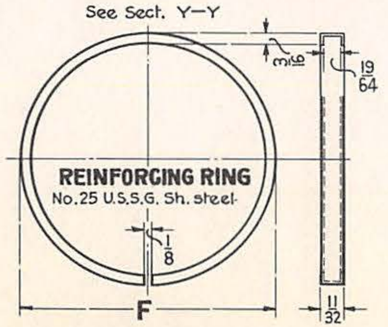
ORD. NO.	LENS DIA.	COUP. RING	REINF. RING	GASKET	FOR
2316-24	$4\frac{1}{2}$	2316-7	2316-14	2316-17	Switch Lamps with Round Type Target Discs.
2316-25	5	2316-8	2316-15	2316-18	
2316-26	$5\frac{3}{8}$	2316-9	2316-16	2316-19	


D
C
3/32
1/32
25°
Radial of lens
3/16
.0219
1/4
1/16
10°
Optical lens

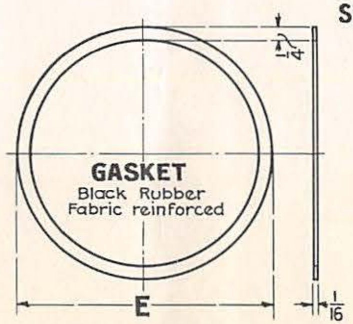
SECT.-ASSEMBLY-Tail lamps


See Sect. X-X
7/8
7/32 R.
7/32
HOOD
No. 18 U.S.S.G. Sh. steel
5/16
A

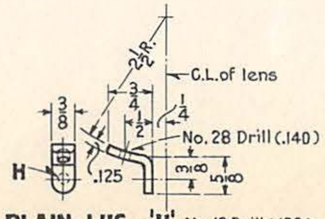
ORD. NO.	LENS DIA.	A
2316-1	$4\frac{1}{2}$	$4\frac{5}{8}$
2316-2	5	$5\frac{1}{8}$
2316-3	$5\frac{3}{8}$	$5\frac{1}{2}$


See Sect. Y-Y
3/16
19/64
REINFORCING RING
No. 25 U.S.S.G. Sh. steel
1/8
11/32
F

ORD. NO.	LENS DIA.	F
2316-14	$4\frac{1}{2}$	$4\frac{9}{16}$
2316-15	5	$5\frac{1}{16}$
2316-16	$5\frac{3}{8}$	$5\frac{7}{16}$

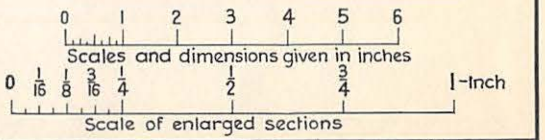

1/4
GASKET
Black Rubber Fabric reinforced
1/16
E

ORD. NO.	E
2316-17	$4\frac{1}{2}$
2316-18	5
2316-19	$5\frac{3}{8}$
2316-20	$6\frac{3}{8}$


2 1/2 R.
C.L. of lens
3/8
3/4
1/4
1/2
No. 28 Drill (.140)
H
.125
3/8
5/8

2316-31 PLAIN LUG-'H'=No. 12 Drill (.189)
2316-32 TAPPED LUG-'H'=No. 25 Tap Drill (10-24)
No. 11 U.S.S.G. Steel

When ordering parts give Name shown in large type with Order Number in tables.


0 1 2 3 4 5 6
Scales and dimensions given in inches
0 1/16 1/8 3/16 1/4 1/2 3/4 1-Inch
Scale of enlarged sections

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

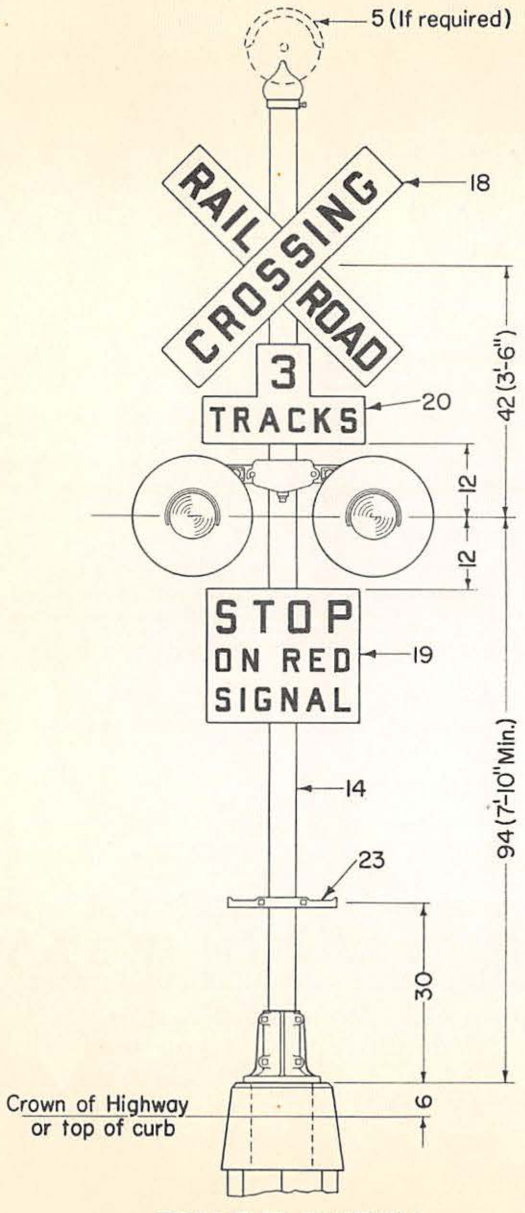
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

2316	
ISSUE	DATE
1	11-27-1934

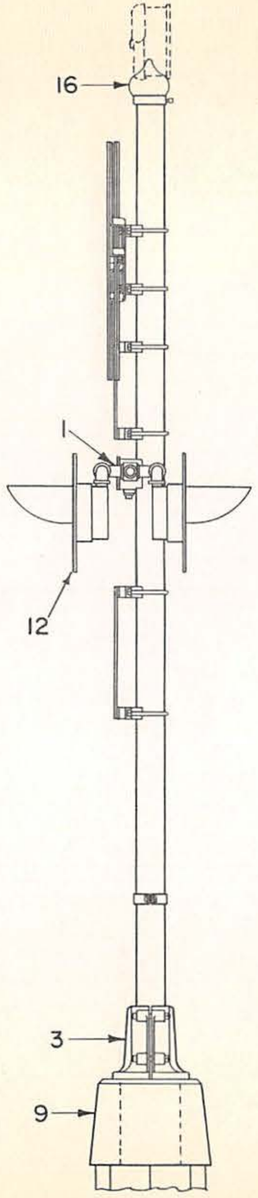
LAMP PARTS
FOR OIL LIGHTED SWITCH AND SEMAPHORE LAMPS

Approved by Representatives of Lines shown.
JC Mock
Chairman

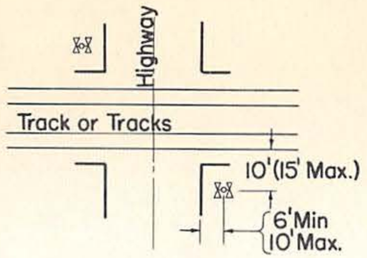
WAH


5 (If required)
18
RAIL
CROSSING
ROAD
3
TRACKS
20
42 (3'-6")
12
12
STOP
ON RED
SIGNAL
19
14
23
30
94 (7'-10" Min.)
6
Crown of Highway
or top of curb

FRONT ELEVATION



SIDE ELEVATION


Highway
Track or Tracks
10'(15' Max.)
6' Min
10' Max.

TYPICAL LOCATION

NOTES:

1. Track sign required only at crossings with two or more tracks. The number of tracks shown on the "TRACKS" sign shall be the total number of tracks lying between the flashing light signals.
2. This plan is typical for parts references. These may be varied when authorized by Chief Signal Engineer.
3. Individual State requirements shall be met.

PAINTING

4. Mast, pinnacle, base, crossarm and pole steps - Aluminum, Item No. 53 Instruction 350.
5. Lamp cases, lamp hoods and circular backgrounds - Flat Black, Item No. 46, Instruction 350.

0 12 24 36 48 60

All dimensions given in inches unless otherwise indicated.

NO.	ITEM	REF.	REQ.
1	Arm, cross (4 way) compl.	AAR 16565	1
2			
3	Base, split	AAR 14492	1
4			
5	Bell (as required)	W.R.S. Co. Type 222 Pl. B5, Ref. 3L	1
6			
7			
8			
9	Foundation, precast	Permacrete S-1	1
10			
11			
12	Lamp, flashing light unit	760	4
13			
14	Mast, 4 in.	2656-1	1
15			
16	Pinnacle	2313-2	1
17			
18	Sign, Crossing (4 in. pipe) compl. Reflex-reflecting material.	AAR 17171	1
19	Sign, Stop (4 in. pipe) compl. Reflex-reflecting material.	AAR 17201	1
20	Sign, Track (4 in. pipe) compl. Reflex-reflecting material.	AAR 17191	1
21			
22			
23	Step, double	2655-1	1
24			
25			

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
HIGHWAY CROSSING SIGNAL
FLASHING LIGHT TYPE
NEW YORK, NEW JERSEY, WEST VIRGINIA, PENNSYLVANIA
OHIO, ILLINOIS AND MASSACHUSETTS

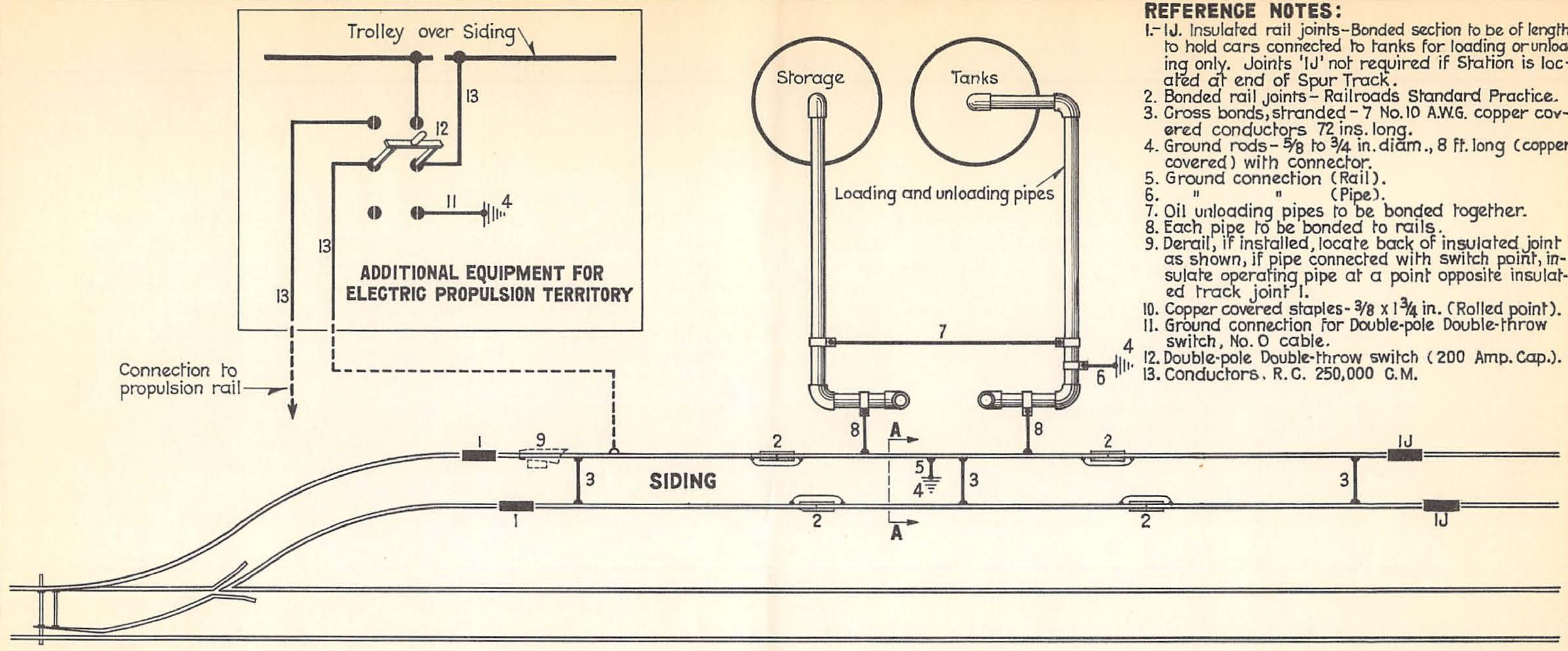
Approved ____________
Chief Signal Engineer

S-2315

Printed in U.S.A.

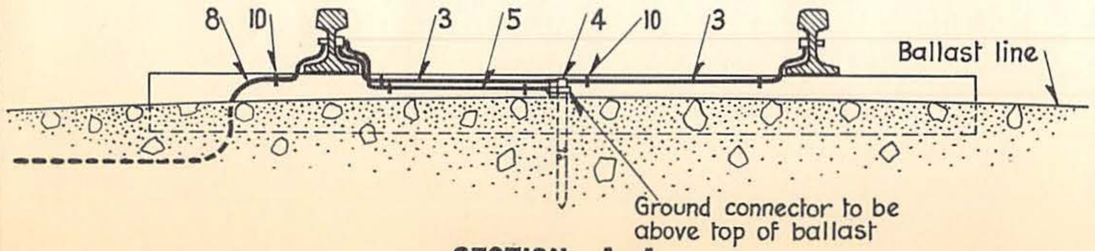
ISSUED 6-1-54

RECEIVED
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.


Trolley over Siding
13
12
11
4
13
13
ADDITIONAL EQUIPMENT FOR ELECTRIC PROPULSION TERRITORY
Connection to propulsion rail
Storage
Tanks
Loading and unloading pipes
7
4
6
8
8
A
A
1
9
2
2
IJ
3
SIDING
5
4
3
3
1
2
2
IJ

REFERENCE NOTES:

1.- IJ. Insulated rail joints-Bonded section to be of length to hold cars connected to tanks for loading or unloading only. Joints 'IJ' not required if Station is located at end of Spur Track.
2. Bonded rail joints - Railroads Standard Practice.
3. Cross bonds, stranded - 7 No. 10 A.W.G. copper covered conductors 72 ins. long.
4. Ground rods - 5/8 to 3/4 in. diam., 8 ft. long (copper covered) with connector.
5. Ground connection (Rail).
6. " " (Pipe).
7. Oil unloading pipes to be bonded together.
8. Each pipe to be bonded to rails.
9. Derail, if installed, locate back of insulated joint as shown, if pipe connected with switch point, insulate operating pipe at a point opposite insulated track joint 1.
10. Copper covered staples - 3/8 x 1 3/4 in. (Rolled point).
11. Ground connection for Double-pole Double-throw switch, No. 0 cable.
12. Double-pole Double-throw switch (200 Amp. Cap.).
13. Conductors. R.C. 250,000 C.M.


8
10
3
5
4
10
3
Ballast line
Ground connector to be above top of ballast

SECTION A—A

Not to Scale

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

PROTECTION OF OIL SIDINGS FROM ELECTRIC SPARKS

(Steam Propulsion Territory)

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(DGL).
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

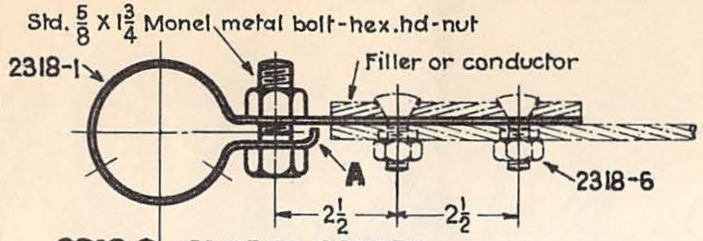
2318

ISSUE	DATE
1	6-24-1931

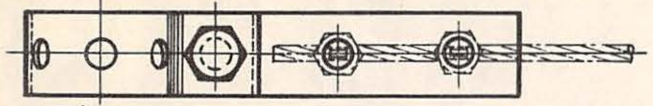
Approved by Representatives of Lines Shown.

J C Mock
Chairman

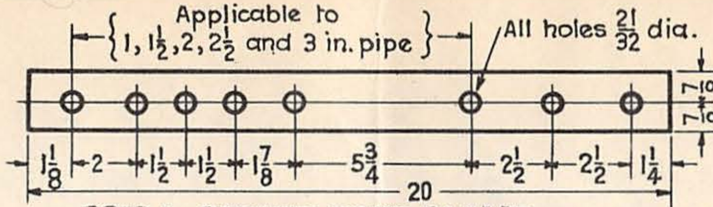
WAH


Std. 5/8 x 1 3/4 Monel metal bolt-hex.hd-nut
2318-1
Filler or conductor
A
2318-6
2 1/2
2 1/2

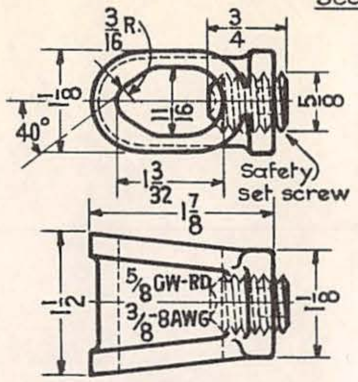
2318-2 CLAMP COMPL. With Monel bolt



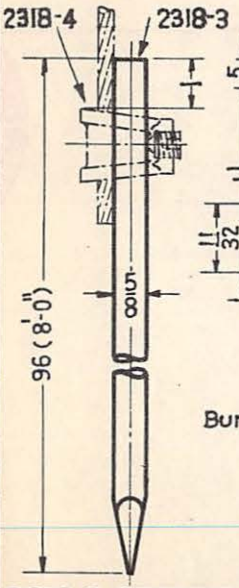
Scale: 3 in. = 1 Ft.

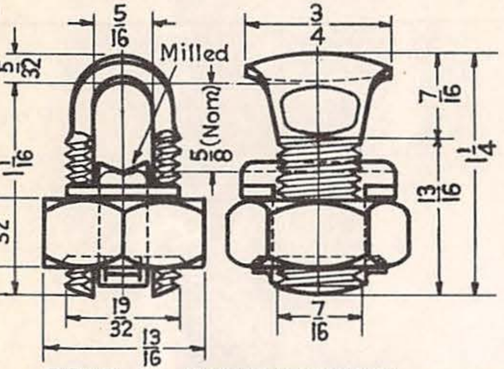

Applicable to {1, 1 1/2, 2, 2 1/2 and 3 in. pipe}
All holes 21/32 dia.
7/8
7/8
3/4
1 1/8
2
1 1/2
1 1/2
1 7/8
5 3/4
2 1/2
2 1/2
1 1/4
20

2318-1 COPPER BOND CLAMP No. 9 A.W.G. (tinned)
(To be cut to required length - Finish as at 'A')
Scale: 2 in. = 1 Ft.


3/16 R.
3/4
1 1/8
11/16
5/8
40°
1 3/32
Safety set screw
1 7/8
1 1/2
5/8 GW-RD
3/8-8AWG
1 1/8

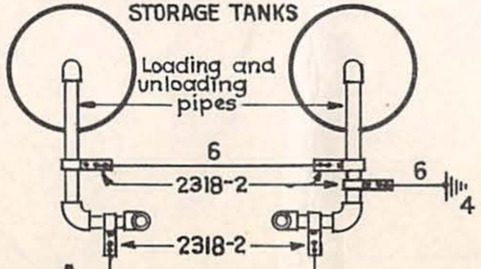
2318-4 GROUND ROD CLAMP
Copperweld or equivalent
Scale: Half size

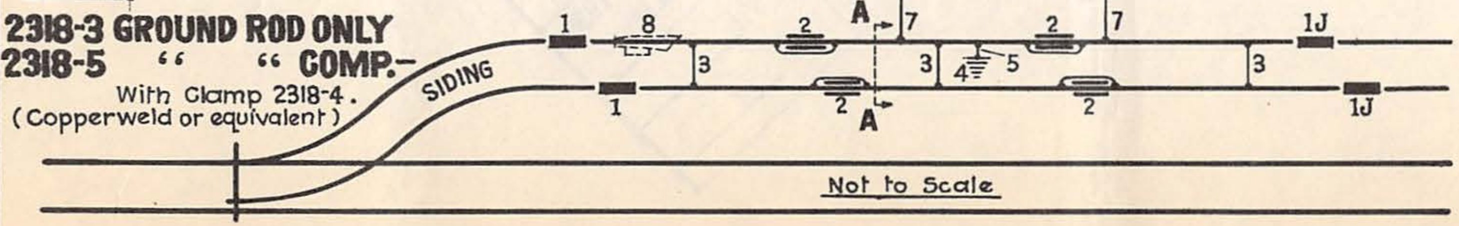

2318-4
2318-3
5/32
5/8
96 (8'-0")


5/16
Milled
3/4
5/32
1 1/16
5/8 (Nom)
7/16
1 1/4
13/16
11/32
19/32
13/16
7/16

2318-6 CONNECTOR
Burndy 'Servit' Type K-23 or equivalent
Scale: Full size

2318-3 GROUND ROD ONLY
2318-5 " " COMP.-
With Clamp 2318-4.
(Copperweld or equivalent)


STORAGE TANKS
Loading and unloading pipes
6
2318-2
6
4
2318-2


A
7
7
1
8
2
2
1J
3
3
4
5
3
SIDING
1
2
A
2
1J

Not to Scale

NOTES:

See N.Y.C. System Electrical Dep't Plan No. 15442 for Oil Sidings in Electric Propulsion Territory.

Bonding and grounding consistant with A.A.R. Recommended Practice, and with N.Y.C. System Signal and Train Control Committee Approved Plan No. 2318.

When ordering parts give number and name shown in large type or in the Reference Table.

Scales: as shown. All dimensions given in inches.

REFERENCE TABLE

1-1J Insulated rail joints - Bonded section to be of length to hold cars connected to tanks for loading or unloading only. Joints '1J' not required if station is located at end of spur track.

2 Bonded rail joints - Railroad's standard practice.

3 Connecting bonds - Type 7B10-A or equivalent 72 inches long.

4 Ground rod with clamp 2318-5.

5 Rail to ground - Type 7S10-A or equivalent 36 inches long. (unloading pipes to ground - see Ref. 6)

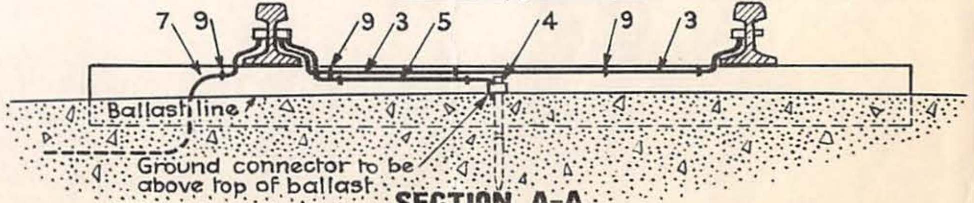
6 Bonding and grounding of unloading pipes - 7 No.12 AWG Copperweld, or equivalent, length as required with connector 2318-6 or equivalent.

7 Bonding pipes to rail - Type 7S12-A or equivalent, if length required is in excess of 60 ins. splice on the required length of 7 No.12 AWG Copperweld, or equivalent, with connector 2318-6.

8 Derail, if installed, locate back of insulated joint as shown, if pipe connected with switch point, insulate operating pipe at a point opposite insulated joint '1'.

9 Copper covered staples - $^{3}/_{8}$ x $1^{3}/_{4}$ in. (rolled point).

Scale: 1/2 in. = 1 Ft.


7
9
9
3
5
4
9
3
Ballast line
Ground connector to be above top of ballast
4

SECTION A-A

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

-DETAILS AND INSTRUCTIONS-
BONDING AND GROUNDING
OF
OIL SIDINGS
STEAM PROPULSION TERRITORY

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2318-A

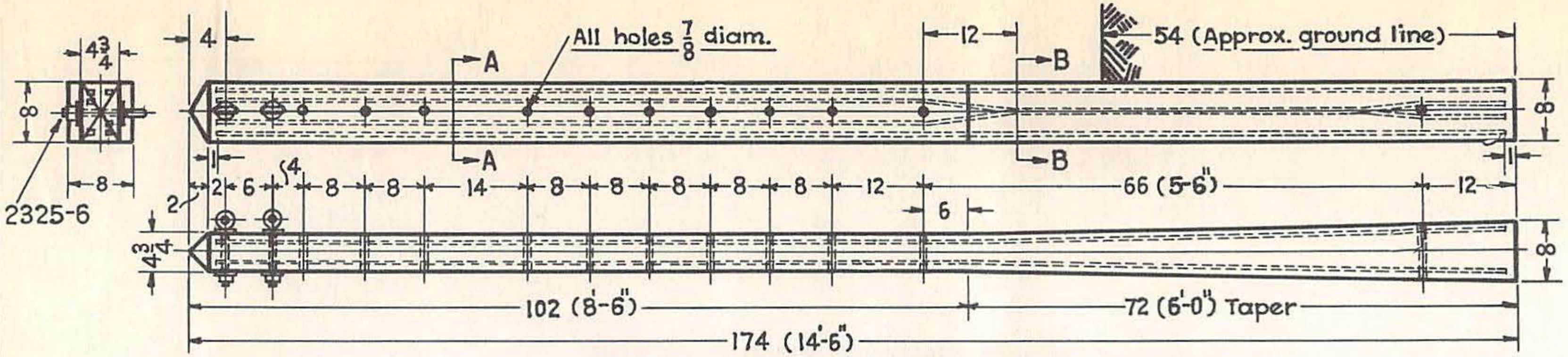
ISSUE	DATE
1	9-18-1934
2	12-20-1935

Approved by Representatives of Lines shown.
J C Mock
Chairman

WAH

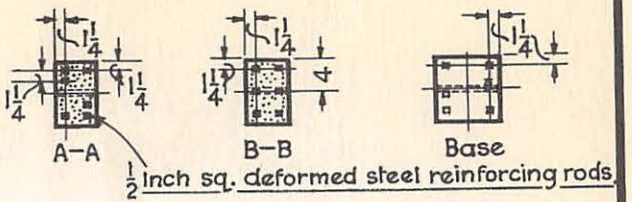
DEPT. MAY 8 1936 U. S. & S. Co.

RECEIVED
MAILING DEPT.
MAY 8 1936
A.M.
Ans'd
Date



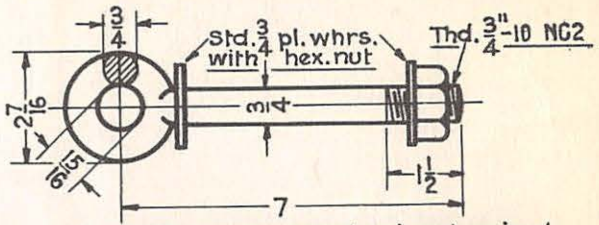
4¾
8
2325-6
4
All holes 7/8 diam.
A
12
B
54 (Approx. ground line)
2
6
4
8
14
12
66 (5'-6")
6
4¾
102 (8'-6")
72 (6'-0") Taper
174 (14'-6")

2325-1 CONCRETE POST ONLY
2325-2 " " COMPL. With eye bolts 2325-6
2325-9 " " " With eye bolts 2325-7



1¼
4
A-A
B-B
Base

½ inch sq. deformed steel reinforcing rods

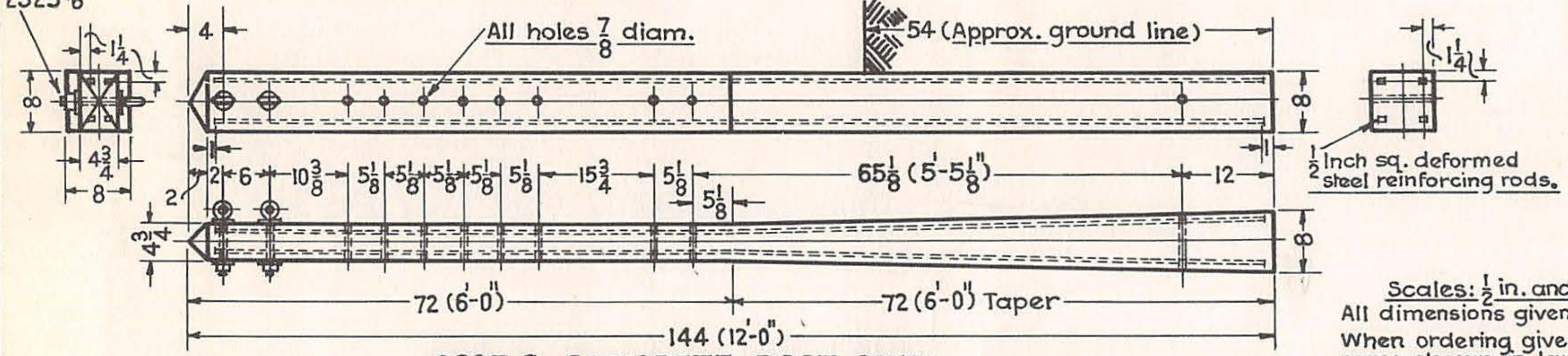


¾
Std. ¾ pl. whrs. with ¾ hex. nut
Thd. ¾"-10 NC2
2 7/16
3/4
15/16
7
1½

Eye bolt, washers and nut galvanized.

2325-5 EYE BOLT ONLY O.H.Steel
2325-6 " " COMPL. With Std.hex-nut
2325-7 " " " With Eye Nut 2325-8

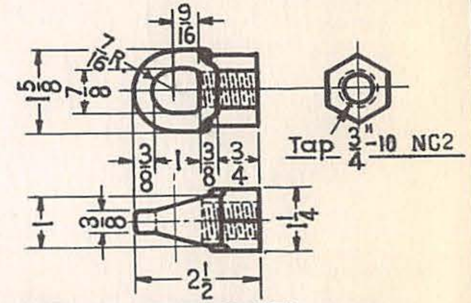
2325-6



1¼
8
4¾
4
All holes 7/8 diam.
54 (Approx. ground line)
2
6
10⅜
5⅛
15¾
65⅛ (5'-5⅛")
12
72 (6'-0")
72 (6'-0") Taper
144 (12'-0")

½ Inch sq. deformed steel reinforcing rods.

2325-3 CONCRETE POST ONLY
2325-4 " " COMPL. With eye bolts 2325-6
2325-10 " " " With eye bolts 2325-7



9/16
7/16 R
1 5/8
7/8
3/8
1
3/4
Tap ¾"-10 NC2
3/16
1¼
2½

2325-8 EYE NUT Mall. Iron
Galvanized

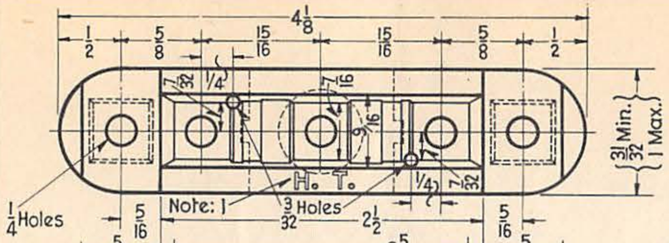
Scales: ½ in. and 3 in. = 1 ft.
All dimensions given in inches.

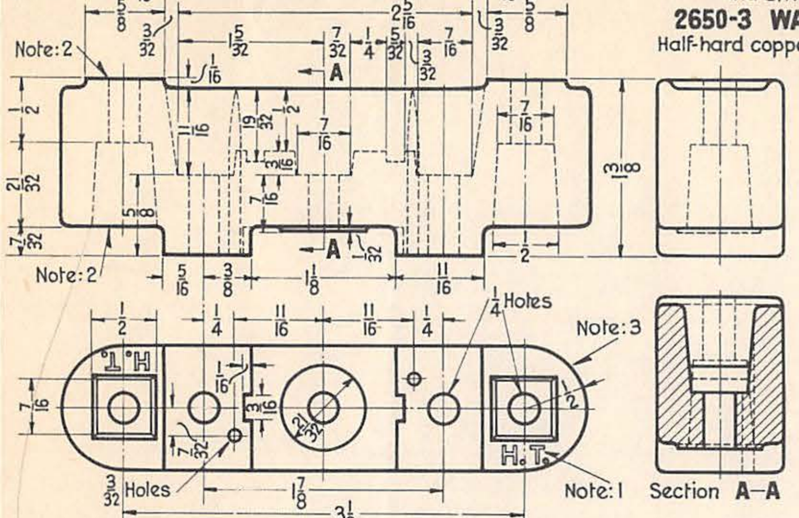
When ordering give number and name shown in large type.

Posts shall be in accordance with Specification No. 82.

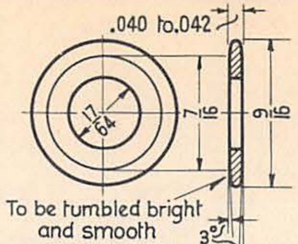
Galvanized bolts and nuts when applied shall be given a coat of rust preventative.

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&St.L.R. B.&A.R.R. P.&L.E.R.R. RUTL.R.R.	**2325**	
		ISSUE	DATE
		1 2	2-24-1934 11-20-1935
CONCRETE POSTS FOR RELAY BOX AND JUNCTION POSTS	Approved by Representatives of Lines shown. J. C. Mock Chairman		


4 1/8
1/2
5/8
15/16
3 1/32 Min.
1 Max.
1/4 Holes
Note: 1
3/32 Holes
H. T.

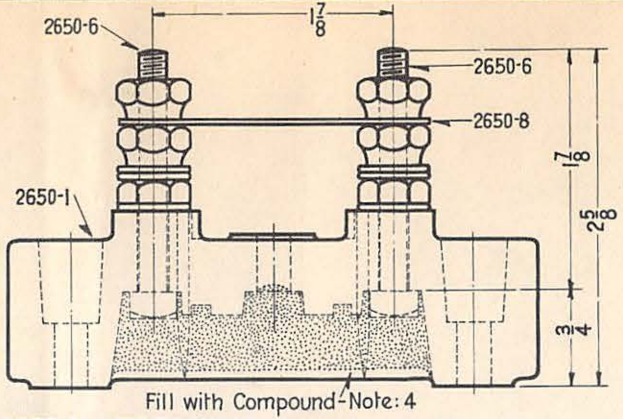

Note: 2
A
1 3/8
Note: 3
1/4 Holes
H.T.
3/32 Holes
1 7/8
3 1/8
Note: 1
Section A—A

2650-1 BASE - HIGH TENSION PORCELAIN
(REVERSIBLE)


.040 to .042
17/64
7/16
9/16
3°

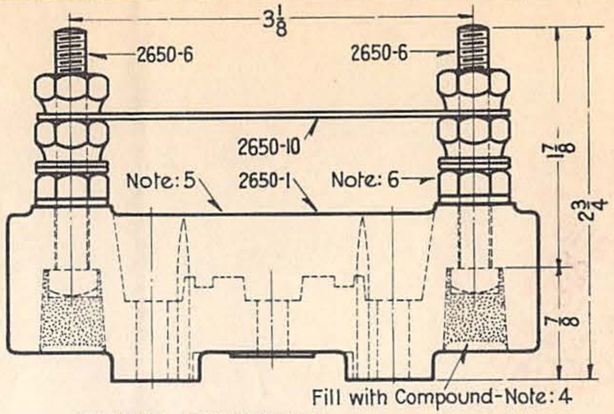
To be tumbled bright and smooth

2650-3 WASHER
Half-hard copper- 5/8 x.043 stock.
(Double scale)


2650-6
1 7/8
2650-6
2650-8
2650-1
1 7/8
2 5/8
3/4

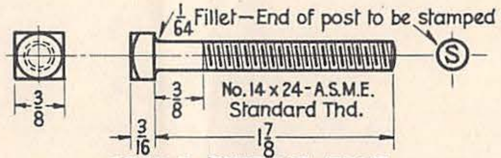
Fill with Compound-Note: 4

2650-11 TERMINAL COMPL.- as shown.


3 1/8
2650-6
2650-6
2650-10
Note: 5
2650-1
Note: 6
1 7/8
2 3/4
7/8

Fill with Compound-Note: 4

2650-12 TERMINAL COMPL.- as shown.

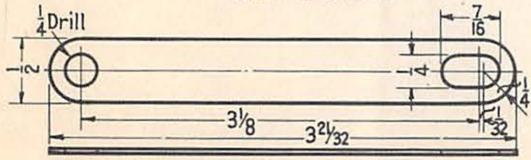

1/64 Fillet—End of post to be stamped thus:
S
3/8
3/8
No. 14 x 24 - A.S.M.E. Standard Thd.
3/16
1 7/8

2650-2 BINDING POST
Non-corrosive Metal
Min. Tensile strength 2700 lbs. per stem diam.

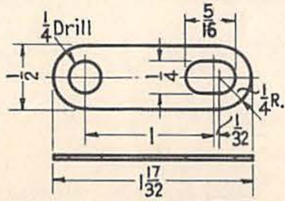
GENERAL NOTES:

1. Letters 'HT' to be moulded on top and bottom surfaces of base as shown, indicating 'High Tension Porcelain'.
2. Base to be glazed on sides and ends only (Top and bottom surfaces including recesses unglazed). Glazing shall not enter holes to in any-way decrease diameters.
3. The porcelain when broken or the glaze removed and submerged in pure water for 100 hours at 70 deg. F. shall not absorb more than 0.40 per cent of its weight.
4. Compound shall not flow at 200 deg. F., nor harden at 0 deg. F., or absorb more than 1/4 of 1 per cent moisture after 100 hours submersion in pure water at 60 deg. F. Surface moisture to be removed before final weighing.
5. After submersion of complete terminal block assembly in water for 6 hours a resistance of at least 1 megohm should be shown from binding post to outside of compound after surface moisture has been removed.
6. All metal parts except binding post shall be nickel or chrome plated.

(See Plan 2651 for detail and assembly of Long & Short Types.

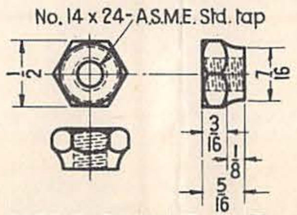

1/4 Drill
7/16
1/2
1/4
1/4 R.
3 1/8
3 21/32
1/32

2650-10 CONNECTOR-For 3 or 3 1/8 in. Post ctrs.
Half-hard copper- No. 18 A.W.G.

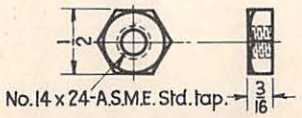

1/4 Drill
5/16
1/2
1/4
1/4 R.
1
1/32
1 17/32

2650-7 CONNECTOR

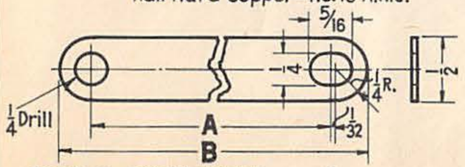
Half-hard copper-No. 18 A.W.G.


No. 14 x 24-A.S.M.E. Std. tap
1/2
7/16
3/16
1/8
5/16

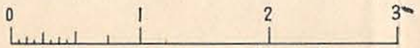
2650-5 BINDING NUT-Brass


1/2
No. 14 x 24-A.S.M.E. Std. tap.
3/16

2650-4 CLAMP NUT-Brass

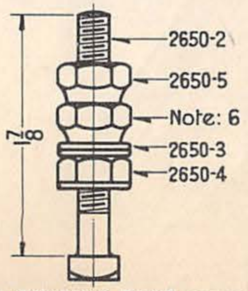

5/16
1/4
1/4 R.
1/2
1/4 Drill
A
B
1/32

2650-8 CONNECTOR—A = 1 7/8 Post ctrs.- B = 2 13/32
2650-9 " —A = 2 3/8 " " - B = 2 29/32
Note: 6
Half-hard copper- No. 18 A.W.G.



Scale and dimensions given in inches.

NOTE: When ordering parts give number and name shown in large type.


2650-2
2650-5
Note: 6
2650-3
2650-4
1 7/8

2650-6 BINDING POST COMPL.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
P.U.T.L.R.R.

2650

ISSUE	DATE
1	10-26-1923
2	5-31-1932

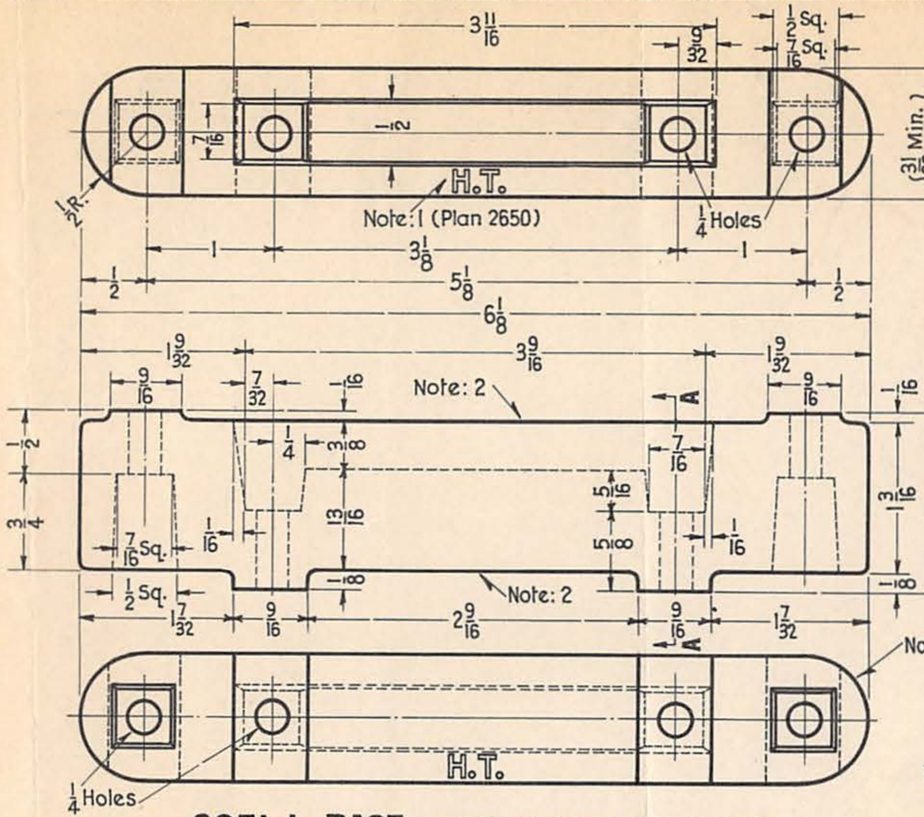
WIRE TERMINAL BLOCKS
(INTERMEDIATE TYPE)

Approved by Representatives of Lines shown.

J.C. Mock
Chairman

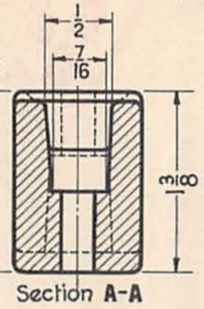
WAH

DEPT. 41
AUG
29
1932
[illegible] CO.

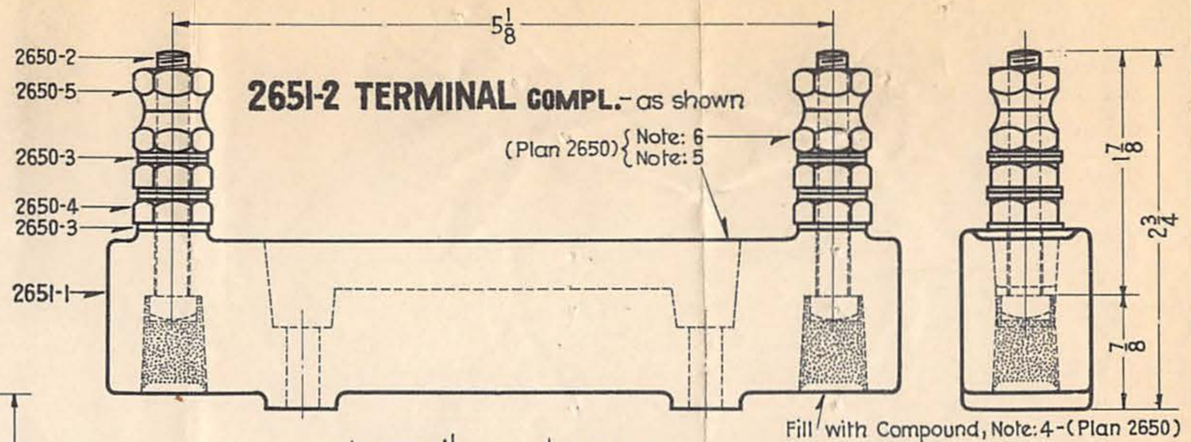


3 11/16
9/32
1/2 Sq.
7/16 Sq.
7/16
1/2
H.T.
Note: 1 (Plan 2650)
1/4 Holes
31/32 Min.
1 Max.
1/2 R.
1
3 1/8
1
1/2
5 1/8
1/2
6 1/8
1 9/32
3 9/16
1 9/32
9/16
7/32
1/16
Note: 2
A
9/16
1/16
1/2
1/4
3/8
7/16
3 1/4
5/16
13/16
1 3/16
5/8
7/16 Sq.
1/16
1/16
1/8
1/8
1/2 Sq.
Note: 2
1 7/32
9/16
2 9/16
9/16
1 7/32
A
Note: 3
H.T.
1/4 Holes

2651-1 BASE — HIGH TENSION PORCELAIN
(REVERSIBLE)

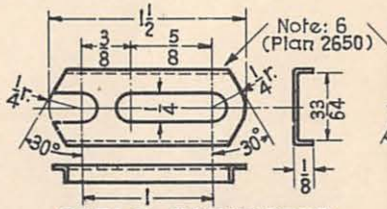


Section **A-A**



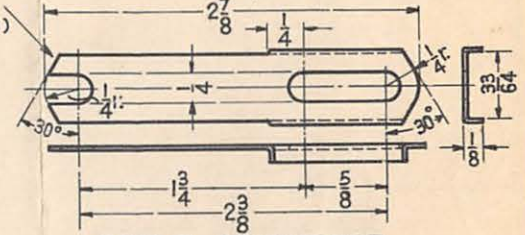
5 1/8
2650-2
2650-5
2650-3
2650-4
2650-3
2651-1
(Plan 2650) { Note: 6
{ Note: 5
1 7/8
2 3/4
7/8
Fill with Compound, Note: 4 - (Plan 2650)

2651-2 TERMINAL COMPL.- as shown



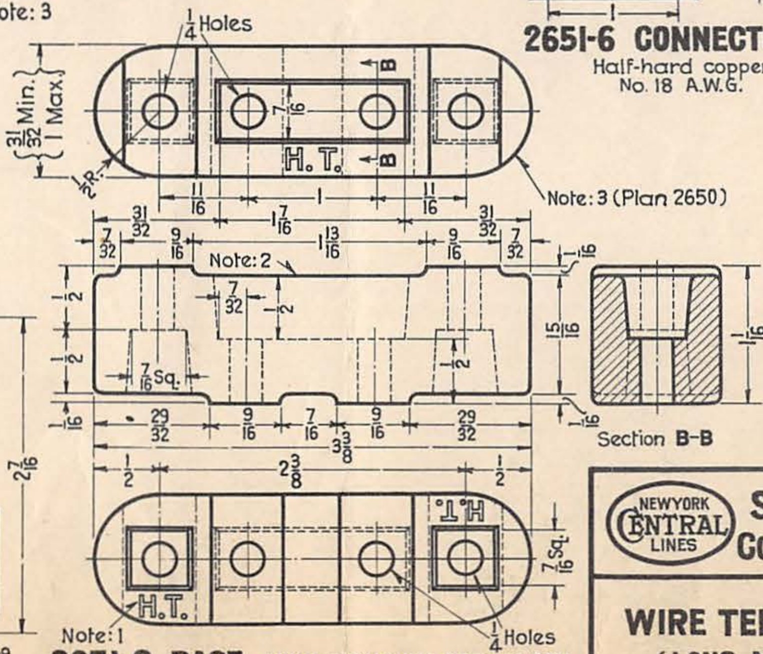
1 1/2
3/8
5/8
Note: 6
(Plan 2650)
1/4 r.
1/4 r.
1/4
30°
30°
33/64
1/8
1

2651-6 CONNECTOR
Half-hard copper
No. 18 A.W.G.



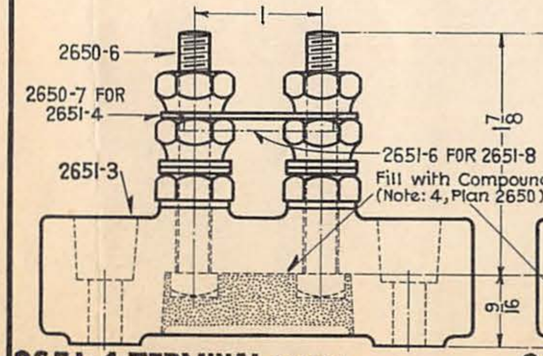
2 7/8
1/4
1/4 r.
1/4 r.
1/4
30°
30°
33/64
1/8
1 3/4
5/8
2 3/8

2651-7 CONNECTOR
Half-hard copper—No. 18 A.W.G.



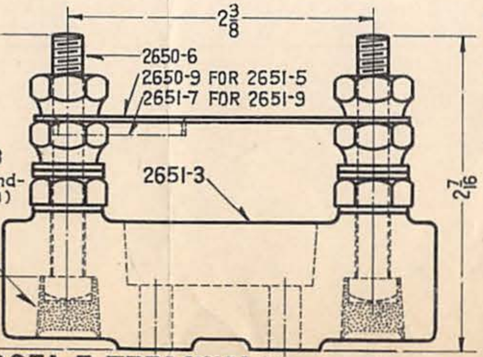
1/4 Holes
B
B
31/32 Min.
1 Max.
7/16
H.T.
1/2 R.
Note: 3 (Plan 2650)
11/16
1
11/16
31/32
1 7/16
31/32
7/32
9/16
1 13/16
9/16
7/32
Note: 2
7/32
1/2
1/16
1/2
1/2
15/16
1 1/16
7/16 Sq.
1/2
1/16
29/32
9/16
7/16
9/16
29/32
3 3/8
1/16
Section B-B
1/2
2 3/8
1/2
H.T.
H.T.
7/16 Sq.
Note: 1
1/4 Holes

2651-3 BASE—HIGH TENSION PORCELAIN
(REVERSIBLE)



1
2650-6
2650-7 FOR
2651-4
2651-3
2651-6 FOR 2651-8
Fill with Compound-
(Note: 4, Plan 2650)

2651-4 TERMINAL COMPL.: CON'R. 2650-7
2651-8 TERMINAL COMPL.: CON'R. 2651-6



2 3/8
2650-6
2650-9 FOR 2651-5
2651-7 FOR 2651-9
1 7/8
2651-3
2 7/16
9/16

2651-5 TERMINAL COMPL.: CON'R. 2650-9
2651-9 TERMINAL COMPL.: CON'R. 2651-7

NOTES: When ordering give Number and Name shown in large type.

See Plan **2650** for Details and Assembly of Intermediate Type Block and General Notes 1 to 6.

0 1 2 3
Scale and dimensions given in inches

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

WIRE TERMINAL BLOCKS
(LONG AND SHORT TYPES)

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL. R.R.

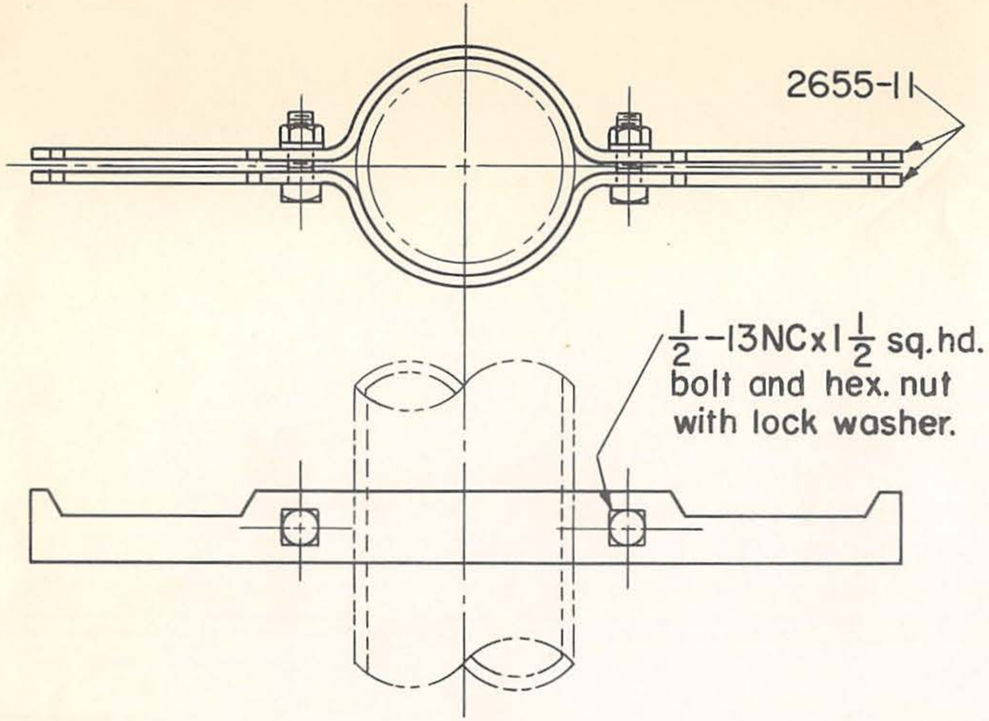
2651

ISSUE	DATE
1	5-31-1932
2	10-23-1933

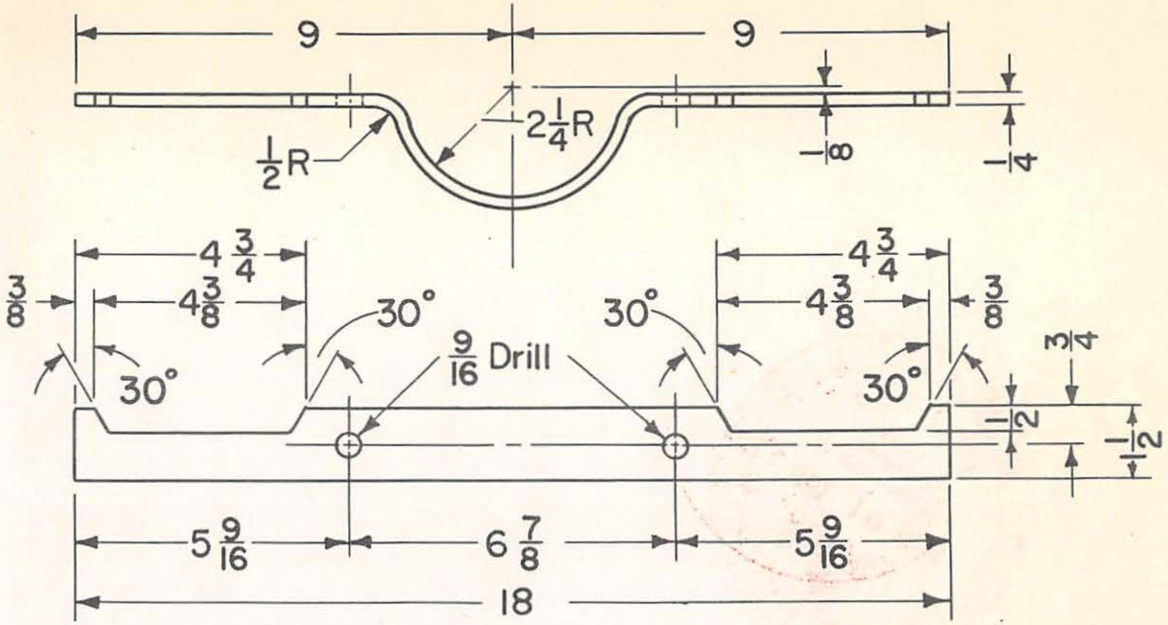
Approved by Representatives of Lines Shown.
J.C. Mock
Chairman

WAH

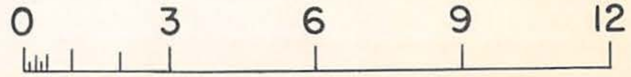
MAY 29 1934
A. M.
NOTE


2655-II
$\frac{1}{2}$-13NCx1$\frac{1}{2}$ sq.hd. bolt and hex. nut with lock washer.

2655-I DOUBLE STEP COMPL.


9
9
$2\frac{1}{4}$R
$\frac{1}{2}$R
$\frac{1}{8}$
$\frac{1}{4}$
$4\frac{3}{4}$
$4\frac{3}{8}$
$\frac{3}{8}$
30°
$\frac{9}{16}$ Drill
30°
$4\frac{3}{4}$
$4\frac{3}{8}$
$\frac{3}{8}$
$\frac{3}{4}$
$\frac{1}{2}$
$1\frac{1}{2}$
$5\frac{9}{16}$
$6\frac{7}{8}$
$5\frac{9}{16}$
18

2655-II DOUBLE STEP



All dimensions given in inches

NOTES:

1. Material - C1020 steel.
2. Protective treatment - Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
POLE STEP
FOR FLASHING LIGHT SIGNALS

Approved
Chief Signal Engineer

S-2655

Printed in U.S.A.

ISSUED 6-1-54

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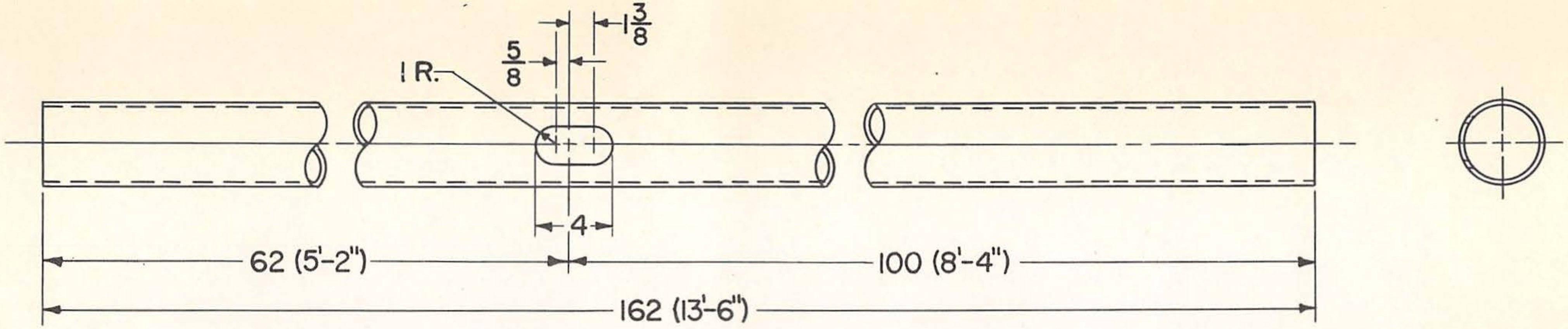
JUL 19 1954
CUSTOMER SERVICE DEPT.
ORD. SECT.



2656-1 FLASHING LIGHT SIGNAL MAST (4 inch standard steel pipe)

NOTE:

Protective treatment- Primer, Item 31, Instruction 350.

0 3 6 12 18

All dimension given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
PIPE MAST
FOR FLASHING LIGHT SIGNALS

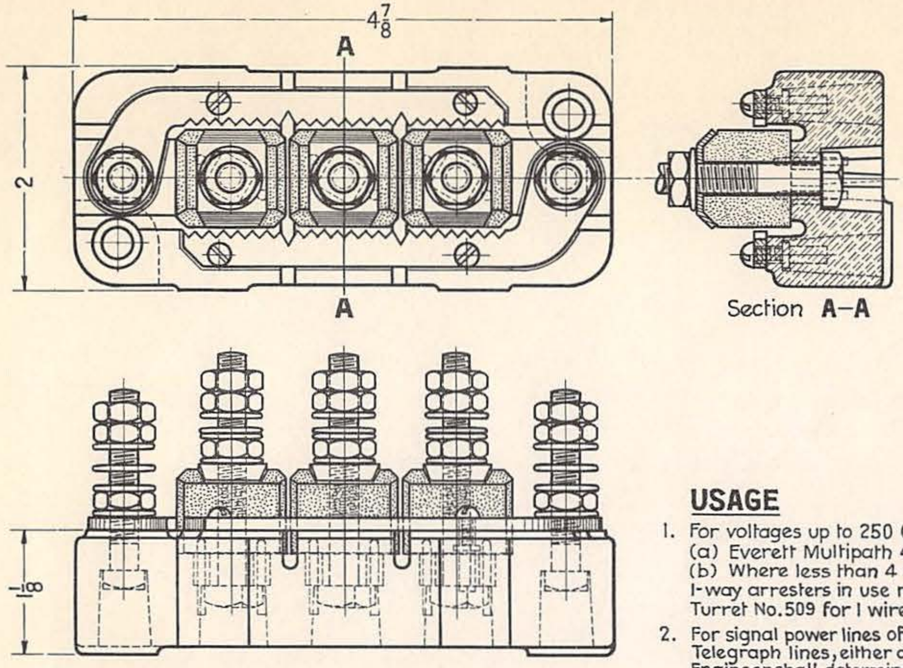
Approved J.J. Corcoran
Chief Signal Engineer

S-2656

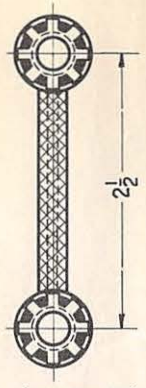
Printed in U.S.A.

ISSUED 6-1-54

RECEIVED
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.



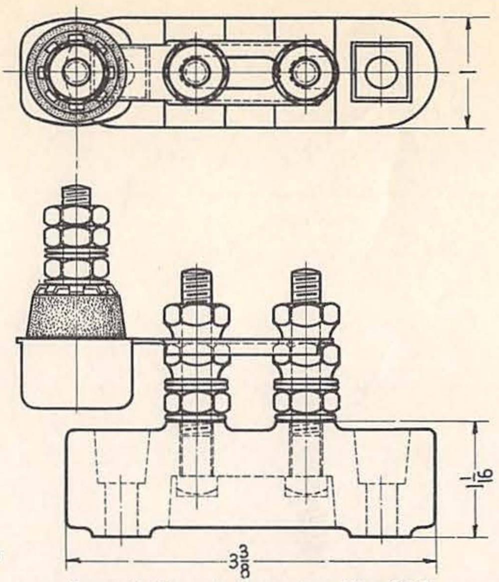
Everett Multipath 4-Way Type **"W"** Arrester
or equivalent, if approved by Signal Engineer.



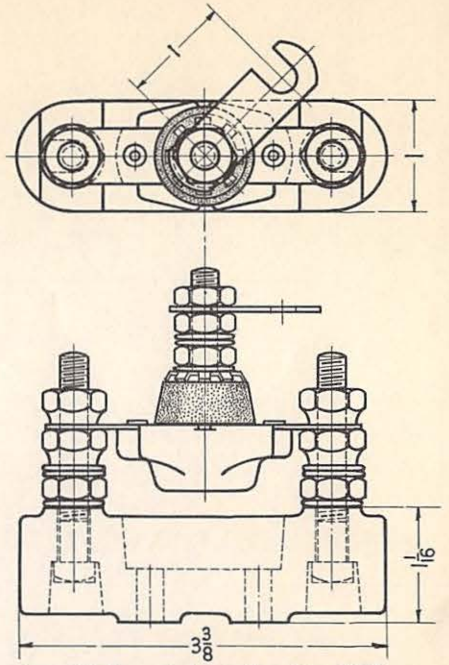
Everett Jumper Wire
No. 525
(For Turret Arrester 509)

USAGE

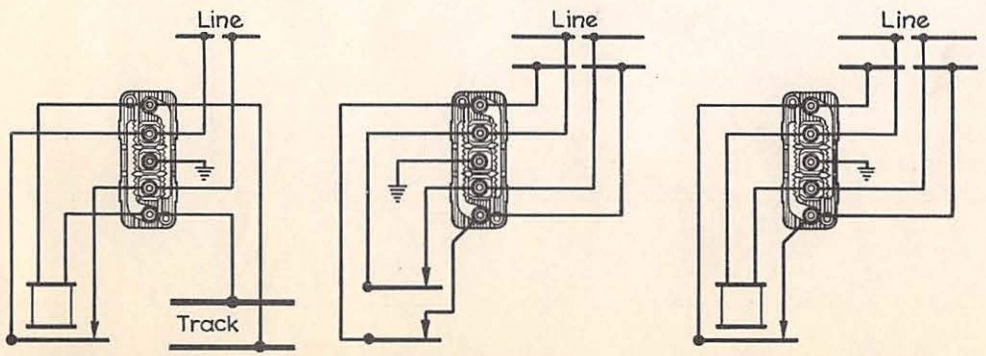
1. For voltages up to 250 (except on signal power line) Use:
   (a) Everett Multipath 4-Way Arrester, Type **"W"**.
   (b) Where less than 4 wires are involved, other acceptable 1-way arresters in use may be used to fill in, such as Everett Turret No. 509 for 1 wire and Everett Turret No. 502 for 2 wires.
2. For signal power lines of 110 to 750 volts located on Western Union Telegraph lines, either above or below W.U.T. wires. The Signal Engineer shall determine the number and type, if and as used.
3. For signal power lines of 750 to 5000 volts, use General Electric "Oxide Film" or Westinghouse "Autovalve".



Everett Turret Arrester **No. 509**
or equivalent, if approved by Signal Engineer.



Everett Turret Arrester **No. 502**
or equivalent, if approved by Signal Engineer.

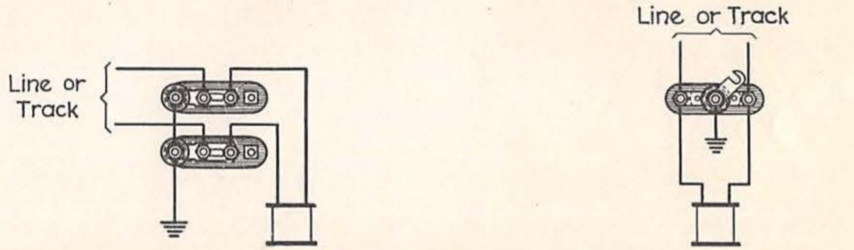


LINE AND TRACK CONNECTION

LINE CONNECTION

LINE CONNECTION AND LINE RELAY

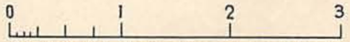
Application of Circuits for Everett Multipath—Type **"W"** Arrester



LINE OR TRACK CONNECTIONS

Application of Circuit for Arrester **No. 509**

Application of Circuit for Arrester **No. 502**



Scale: and dimensions given in inches

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

2660

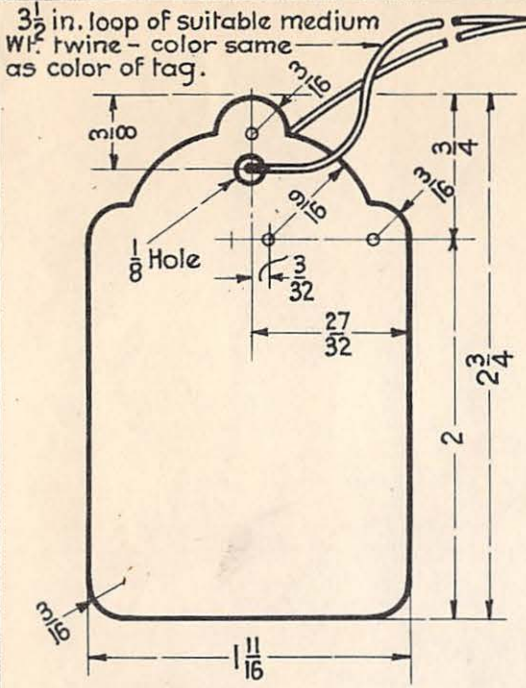
ISSUE	DATE
1	2-19-1935

LIGHTNING ARRESTERS
AND
INSTRUCTIONS ON THIER USE

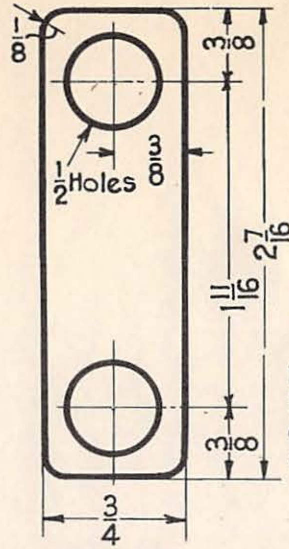
Approved by Representatives of Lines shown.
J C Mock
Chairman

WAH

Plan revised May 29'1941 and renumbered 2700, Issue No.1; was old No. 2655, Issue: 1 of 10-18-1933.


3½ in. loop of suitable medium Wt. twine - color same as color of tag.
3/16
3/8
3/4
3/16
9/16
1/8 Hole
3/32
27/32
2 3/4
2
3/16
1 11/16

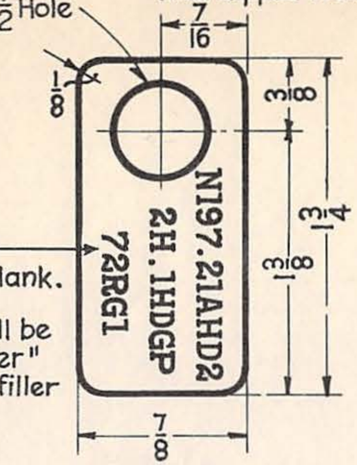
2700-1 — Red
2700-2 — Yellow
2700-3 — Green
2700-4 — White
Suitable Grade Cardboard .014 to .020 in. thick.
(To be typewritten or marked by hand)


1/8
3/8
1/2 Holes
3/8
2 7/16
1 11/16
3/8
3/4

2700-5
Hard vulcanized Black Fibre-1/16 in. thick.

Sample of stenciling
Tags shall be furnished blank.

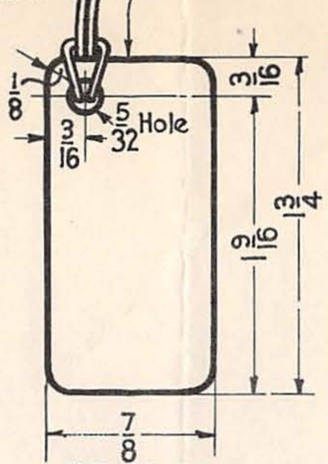
Letters and numerals shall be filled with "Atlas White Filler" or equivalent and surplus filler on face wiped off.


1/2 Hole
7/16
1/8
3/8
N197.21AHD2
2H.1HDGP
72RG1
1 3/4
1 3/8
7/8

2700-6
Hard vulcanized Black Fibre-1/16 in. thick.

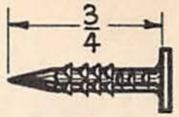
RACO 359-1

3½ In. loop of No.12 end lockstitch beeswaxed twine impregnated with bitter aloes, knot dipped in shellac.

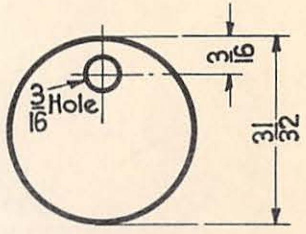

3½
1/8
3/16
5/32 Hole
3/16
1 9/16
1 3/4
7/8

2700-7
Hard vulcanized Black Fibre-1/16 in. thick.

RACO 359-6

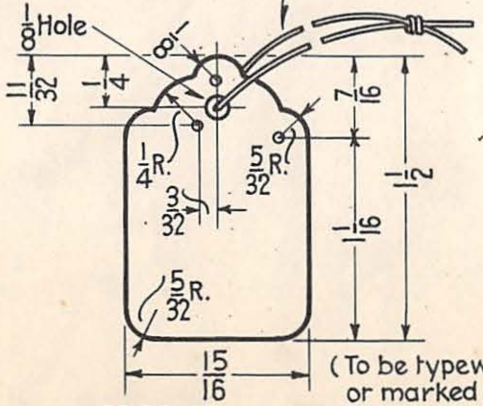


2700-9
No. 13 Tinned barbed wire Roofing Nail (Regular head)


3/16 Hole
3/16
31/32

2700-8
Aluminum No. 20 A.W.G.
(To be marked with stencils)

3 in. loop of suitable medium wt. twine - color same as color of tag.


1/8 Hole
1/8
11/32
1/4
7/16
1/4 R.
5/32 R.
3/32
1 1/2
1 1/16
5/32 R.
15/16

(To be typewritten or marked by hand)

2700-10 — Red
2700-11 — Yellow
2700-12 — Green
2700-13 — White
Suitable Grade Cardboard .014 to .020 in. thick.

ORDERING REFERENCE FOR GRAPHOTYPE MACHINE

Model No. 6140 — Reversible Type: Using No. 12 Indenting Type 1/8 inch high, 10 to the inch.
(For marking fibre tags 2700-5, 2700-6 and 2700-7)

Scale: Full size.
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

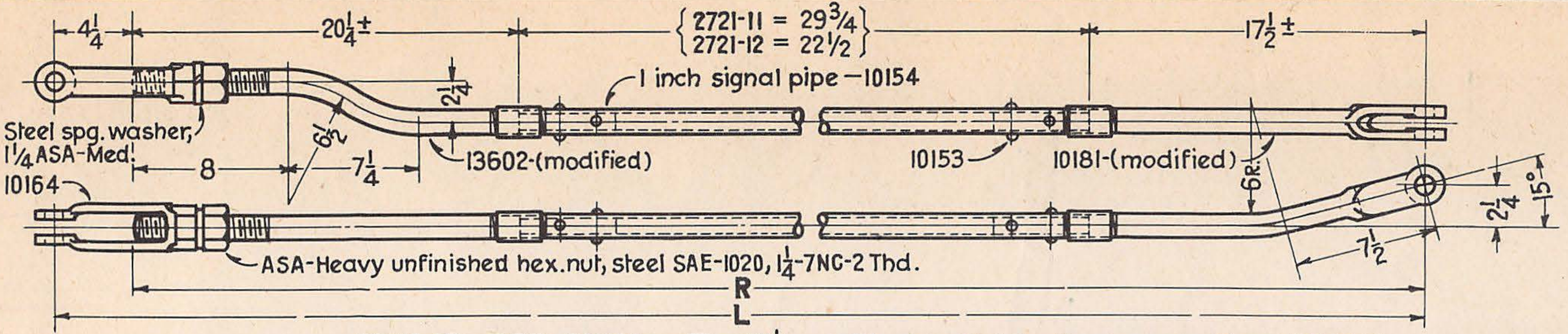
N.Y.C.R.R.
M.C.R.R.
C.C.C.&STL.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

2700
1 | 7-10-1941

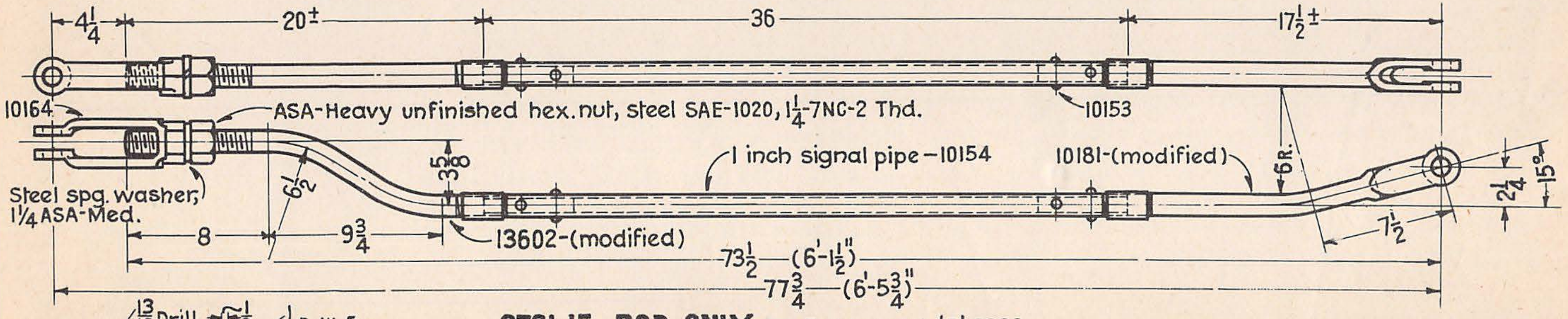
TAGS
FOR MARKING WIRES

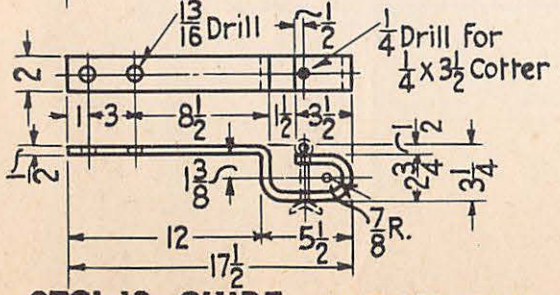
Approved by Representatives of Lines shown.
Chairman

2721A (11-2-1946)
Plan redrawn and revised, was old plan 5850E (5) of 4-7-1931.


4¼
20¼±
2721-11 = 29¾
2721-12 = 22½
17½±
1 inch signal pipe—10154
2¼
Steel spg. washer, 1¼ ASA-Med.
6½
8
7¼
13602-(modified)
10153
10181-(modified)
6R.
10164
2¼
15°
7½
ASA-Heavy unfinished hex.nut, steel SAE-1020, 1¼-7NC-2 Thd.
R
L

2721-13 ROD ONLY—**R** = 67½ – With pipe 2721-11—For Layouts 'A' and 'C' 3890
2721-1 ROD COMPL.–**L** = 71¾ – With screw jaw-nut-spg.washer
2721-14 ROD ONLY—**R** = 60¼ – With pipe 2721-12—For Layout 'AA' 3890
2721-2 ROD COMPL.–**L** = 64½ – With screw jaw-nut-spg.washer


4¼
20±
36
17½±
10164
ASA-Heavy unfinished hex.nut, steel SAE-1020, 1¼-7NC-2 Thd.
10153
1 inch signal pipe—10154
10181-(modified)
6R.
3⅝
6½
Steel spg. washer, 1¼ ASA-Med.
8
9¾
13602-(modified)
73½—(6'-1½")
77¾—(6'-5¾")
2¼
15°
7½


13/16 Drill
½
¼ Drill for ¼ x 3½ Cotter
2
1
3
8½
1½
3½
½
2
1⅜
2¾
3¼
⅞R.
12
5½
17½

2721-16 GUIDE SAE-1020 steel

2721-15 ROD ONLY— For Layout 'B' 3890
2721-3 ROD COMPL.– With sc.jaw-nut-spg.washer

NOTES: See 2720 and 1399 for derail target stands. Protective treatment shall be in accordance with Instruction 350.

0 3 6 9 12
Scale and all dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

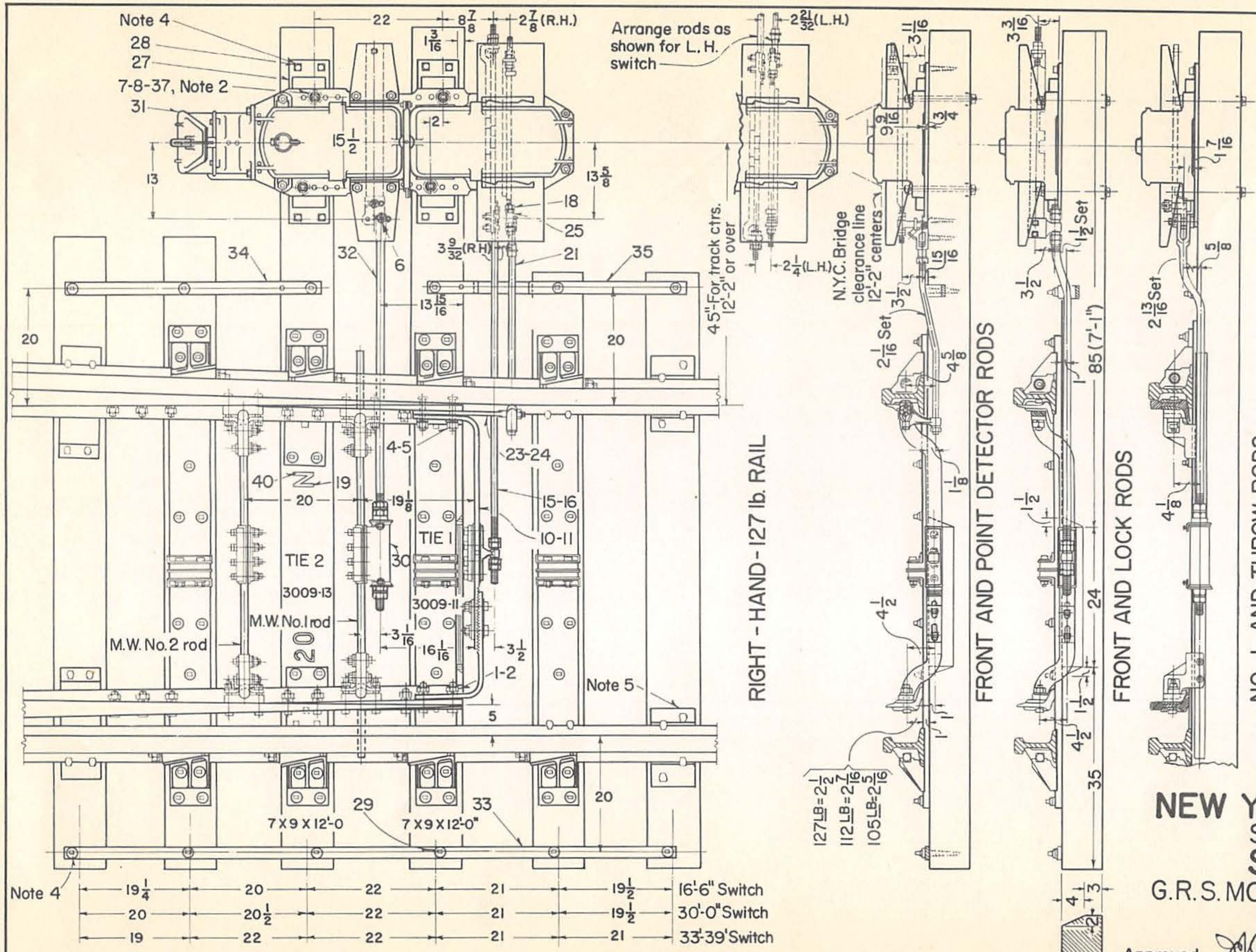
2721A
11-2-1946

DERAIL TARGET RODS

Approved by Representatives of Lines shown.
J J Corcoran
Chairman

(Printed in U.S.A.)

RECEIVED
APR 27 1948
SPECIFICATION DEPT.


Note 4
28
27
7-8-37, Note 2
31
22
8 7/8
2 7/8 (R.H.)
1 3/16
15 1/2
2
13
13 5/8
18
25
21
34
32
6
3 9/32 (R.H.)
35
13 15/16
20
20
Arrange rods as shown for L.H. switch
2 21/32 (L.H.)
4 5" For track ctrs. 12'-2" or over
2 1/4 (L.H.)
N.Y.C. Bridge clearance line 12'-2" centers
RIGHT-HAND-127 lb. RAIL
4-5
23-24
40
19
20
19 1/8
15-16
10-11
TIE 1
TIE 2
30
3009-13
3009-11
M.W. No. 1 rod
M.W. No. 2 rod
3 1/16
16 1/16
3 1/2
1-2
Note 5
5
20
29
33
7 X 9 X 12'-0
7 X 9 X 12'-0"
Note 4
19 1/4
20
22
21
19 1/2
16'-6" Switch
20
20 1/2
22
21
19 1/2
30'-0" Switch
19
22
22
21
21
33'-39' Switch
1 1/16
3 1/16
3/4
9/16
15/16
3 1/2
2 1/16 Set
4 5/8
1 1/8
4 1/2
127 LB = 2 1/2
112 LB = 2 7/16
105 LB = 2 5/16
FRONT AND POINT DETECTOR RODS
3 3/16
1 1/2 Set
3 1/2
85 (7'-1")
1 1/2
24
1 1/2
4 1/2
35
4
3
2
FRONT AND LOCK RODS
1 7/16
5/8
2 13/16 Set
4 1/8
NO. 1 AND THROW RODS

NOTES:

1. Remove one splice plate from No. 1 switch rod and install switch adjustment bracket, Item 30.
2. Item 7 to be A.S.A. Regular double end stud bolt with square nuts and spring washers, Item 37
3. Where necessary to secure additional clearance for Front Rod, Tie No. 1 may be shifted a maximum of one-half inch.
4. Holes for Drive Spikes, Item 28, to be one-half inch in diameter and five inches deep.
   Holes for Drive Spikes, Item 29, to be five-eighths inch in diameter and five inches deep.
5. Double shoulder tie plates shall be provided on five ties starting with second tie ahead of switch points.
6. Protective treatment – Paint, Item 32, Instruction 350.

0 12 24 36
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
G.R.S. MODEL 5A & 5C SWITCH MACHINES
127-112-105 LB. RAIL

Approved J.J. Corcoran
Chief Signal Engineer

S-3000

Printed in U.S.A.

ISSUED 6-1-54
SHEET 1 OF 2

RECEIVED
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.

NO	ITEM	REF.	REQ	USE	NO	ITEM	REF.	REQ.	USE	NO	ITEM	REF.	REQ	USE
1	Bolt, 3/4 X 3 1/2 compl.	3001-Y	2	Fr. Rod-105LB.	25	Pt.-Detector Ball Stud Lug, complete	3006-9	1	Conn. at Sw. Mach.	(SUPPLEMENTARY-FURNISHED BY M. OF W. DEPARTMENT)				
2	" 1 X 4 "	3001-U		Fr. Rod-112,127LB.	26					49	Double Shoulder Tie Plates	EC, G-21	10	127LB. Rail
3					27	Saddle plate, complete	3004-1	2	Switch Machine	50	" " " "	EC, G-24		112, 105LB. Rail
4	Bolt, 3/4 X 4 1/4 "	3001-Z	2	Fr. Rod-105LB	28	Spike, Drive-6 long, 5 thd., Oliver or Equal	21-C-361	8	Saddle Plate	51				
5	" 1 X 4 3/4 "	3001-V		Fr. Rod-112,127LB	29	" " " " "	21-C-279B	12	Tie Straps	52				
6	"	3007-1	1	Throw Rod	30	Switch Adjustment Bracket	46948-12 Gr. 1	1	G.R.S. Ref.-Note 1	53	Tie No. 1-7 X 9 X 12'-0"	3009-11	1	R. H. Layout
7	Bolt, Stud, 3/4 X 12, Compl. with nuts.	Note 2	4	Switch Machine	31	Switch Machine		1	As required	54	Tie No. 1-7 X 9 X 12'-0"	3009-12		L. H. Layout
8	Bolt Grip Raco	589-1	4	Item 7	32	Throw Rod, complete	3002-7	1		55	Tie No. 2-7 X 9 X 12'-0"	3009-13	1	R. or L.H. Layout
9					33	Tie Strap-long	3909-11	1		56				
10	Front Rod, Complete	3001-2	1	112, 127LB Point	34	" " -short	3909-12	1		57				
11	" " "	3001-3		105LB Point	35	" " -short; set	3909-13	1		58				
12					36					59				
13					37	Washer, Coml. Spring-.244X.226X3/4		4	Item 7	60				
14					38					61				
15	Lock Rod, complete- R. H.	3003-2	1	127-112-105LB	39					62				
16	" " " -L. H.	3003-1		" " "	40	Wood Screws, 2 in. No. 10 Flat Head		8	Item 19	63				
17					41					64				
18	Nut-ASA-UNC-2B Heavy hex. jam 3/4-10		4	Item 21 at Sw. Mach.	42					65				
19	Numerals-Letter "N"	2280		Sw. No. & position	43					66				
20					44					67				
21	Pt.-Detector Rod, compl.	3005-1	1		45					68				
22					46					69				
23	Point Lug, compl.	3006-2	1	112-127LB	47					70				
24	" " "	3006-3		105LB	48					71				

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
G.R.S. MODEL 5A & 5C SWITCH MACHINES
127-112-105 LB. RAIL

Approved Corcoran
Chief Signal Engineer

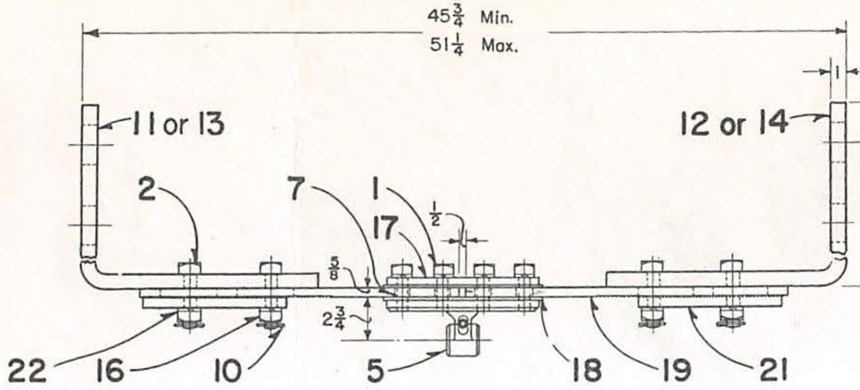
S-3000

Printed in U.S.A.

ISSUED 6-1-54
SHEET 2 OF 2

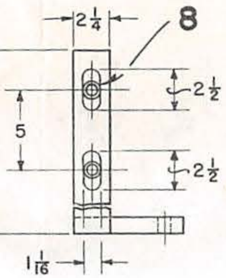
RECEIVED
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.

Heavy, Unfinished, Sq. Hd. Bolts, AAR Spec., M. P. 17
Medium Steel Spring Washers, AAR Spec., M. P. 35

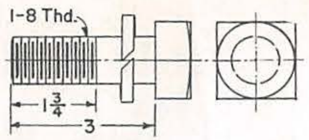

45 3/4 Min.
51 1/4 Max.
1
11 or 13
12 or 14
2
7
1
17
1/2
5/8
2 3/4
L
22
16
10
5
18
19
21

STANDARD ASSEMBLY SHOWN

Assembly To Be Made As Indicated On Switch Layout Plans.


2 1/4
8
2 1/2
5
2 1/2
1 1/16

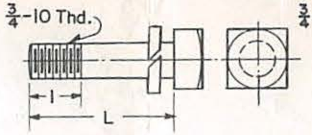
SIDE VIEW
SWITCH LUG, R. H.


1-8 Thd.
1 3/4
3

3001-28, BOLT COMPL.

For applying GRS switch adjusting bracket 46948-13 Gr. 2 to M. of W. rod, double slip switch.

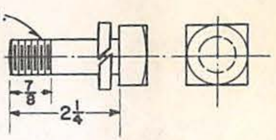
0 1 2 3 4 5 6
All dimensions given in inches



3001-18, BOLT COMPL.
L=3 Inches

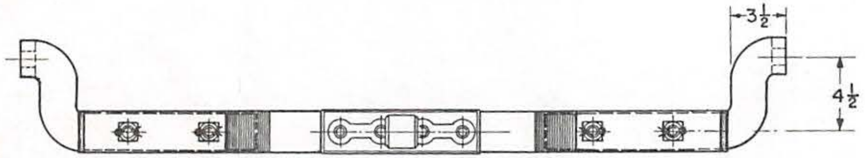
3001-19, BOLT COMPL.
L=3-1/2 Inches

For applying GRS switch adjusting bracket 46948-12, Gr. I or bracket 3001-21 to M. of W. switch rods.


3/4-10 Thd.
7/8
2 1/4

3001-58, BOLT COMPL.

For applying bracket 3001-21 to front rods.



3001-50,- FRONT ROD, ADJUSTABLE-(L=11-1/2)
3001-55,- FRONT ROD, ADJUSTABLE-(L=13-1/2)

APPLIES TO 127 LB. RAIL, FOR 105 LB. RAIL SPECIFY BUSHINGS, ITEMS 8 & 9.

0 3 6 9 12 18 24
All dimensions given in inches.

NO.	ITEM		3001-50	3001-51	3001-53	3001-55	REMARKS
1	Bolt, 3/4-10 X 2-1/4, Sq. Hd.	3001-58	4	4	4	4	
2	Bolt, 3/4-10 X 3-1/2, Sq. Hd.		4	2	2	2	
3							
4							
5	Bracket, Compl.	3001-21	1	1	1	1	
6							
7	Bushing, Insulation	AAR 10553	4	4	4	4	
8	Bushing - For 3/4 Bolt, Front Rod only		2	2	2	2	105 Lb. Rail
9	Bushing - For 3/4 Bolt, Front Rod & Point Lug		2			2	105 Lb. Rail
10	Cotter Pin 3/16 X 1-1/4		4	2	2	4	
11	Lug, Switch Point L.H. L=13-1/2					1	
12	Lug, " " R.H. L=13-1/2					1	
13	Lug, " " L.H. L=11-1/2		1	1			
14	Lug, " " R.H. L=11-1/2		1		1		
15							
16	Nut, 3/4-10 Thd., Sq. Hd.		4	2	2		
17	Plate, Connecting	AAR 10551	1	1	1		
18	Plate, Insulation	AAR 10552	2	2	2		
19	Plate, Center		2	1	1		
20	Rod, Front - Straight	3001-59		1	1		
21	Washer, Plate		2	1	1		
22	Washer, Lock - 3/4		4	2	2		

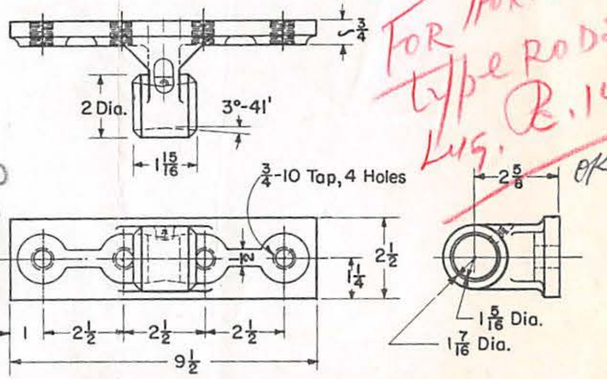
NOTES:

1 - Bolts, Nuts and Threads to be as specified on N.Y.C.S. Plan G35 unless otherwise indicated.

2 - Washers to be in accordance with current AREA specifications.

3 - Protective treatment,- Primer, Item 31, Instr. 350. or manufacturer's equivalent.

4M 376175
B 8060-60


3/4
2 Dia.
3°-41'
1 15/16
3/4-10 Tap, 4 Holes
2 5/8
2 1/2
1 1/4
1/2
1
2 1/2
2 1/2
2 1/2
9 1/2
1 5/16 Dia.
1 7/16 Dia.

FOR HORIZONTAL type RODS use Lug. R.14765

OK RHW
2/10/66

3001-21,- BRACKET, COMPL.

WITH 1/4 IN., STRAIGHT, DRIVE OILER
MATERIAL- STEEL, ASTM-A27-46T, GRADE 65-30.

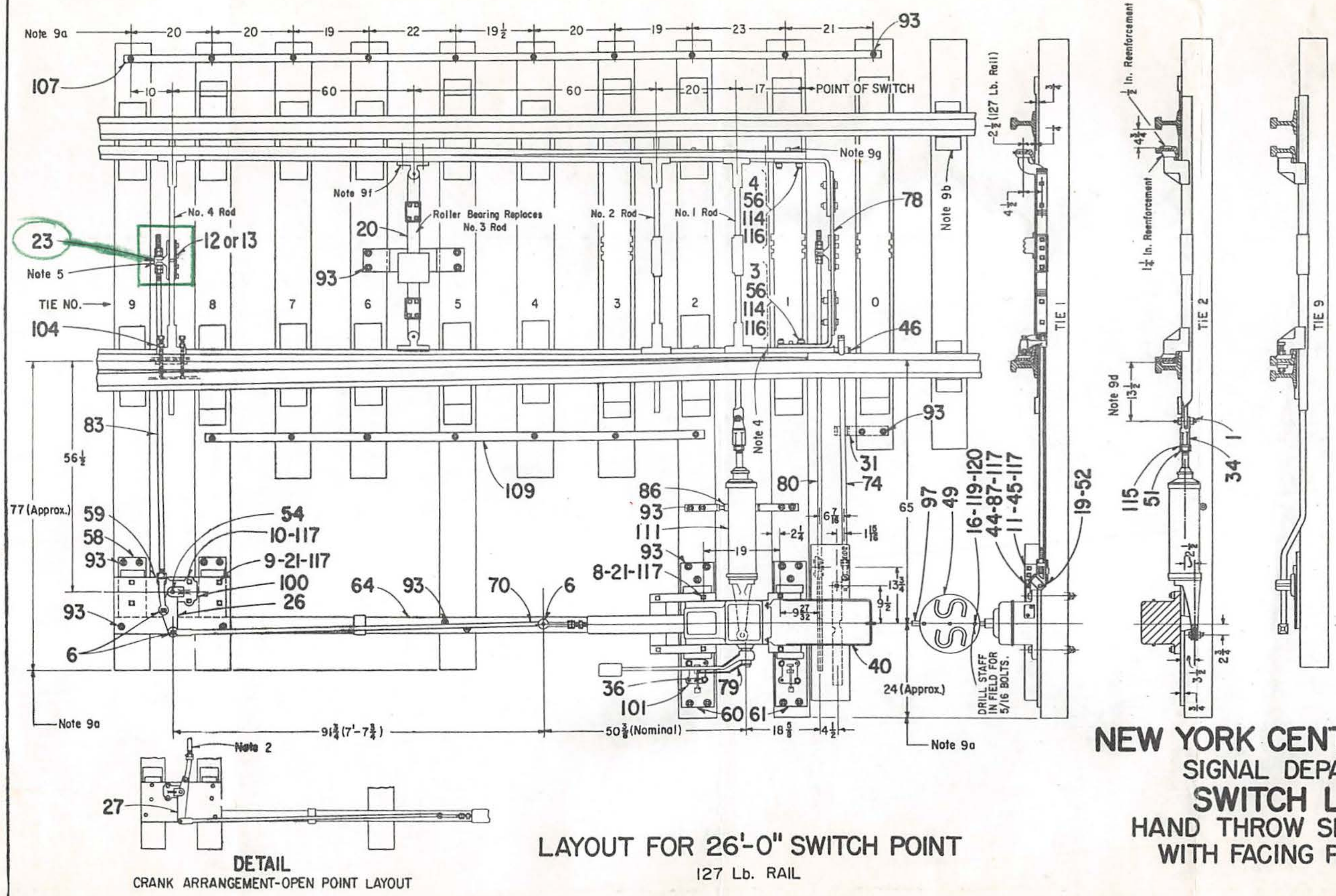
0 3 6 9 12
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FRONT RODS
ADJUSTABLE

S-3001

Printed in U.S.A.

ISSUED 1-14-63
SHEET 1 Cont'd on Sh. 2


Note 9a
20
20
19
22
19½
20
19
23
21
93
107
10
60
60
20
17
POINT OF SWITCH
Note 9g
Note 9f
No. 4 Rod
Roller Bearing Replaces No. 3 Rod
No. 2 Rod
No. 1 Rod
4
56
114
116
78
Note 9b
23
12 or 13
20
Note 5
93
3
56
114
116
TIE NO.
9
8
7
6
5
4
3
2
1
0
104
46
93
83
56½
109
Note 4
31
74
80
86
93
111
93
8-21-117
65
97
49
16-119-120
44-87-117
11-45-117
19-52
77 (Approx.)
59
58
93
54
10-117
9-21-117
100
26
64
93
70
6
19
2¼
6 7/16
1 15/16
13¾
9½
9 27/32
93
6
36
101
79
60
61
40
24 (Approx.)
DRILL STAFF IN FIELD FOR 5/16 BOLTS.
Note 9a
91¾ (7'-7¾)
50⅜ (Nominal)
18⅝
4½
Note 9a
Note 2
27
DETAIL
CRANK ARRANGEMENT-OPEN POINT LAYOUT
2½ (127 Lb. Rail)
¾
¼
4½
TIE 1
½ In. Reenforcement
4¾
1¼ In. Reenforcement
Note 9d
13½
115
51
34
1
2½
2¾
3½
¾
TIE 2
TIE 9

LAYOUT FOR 26'-0" SWITCH POINT

127 Lb. RAIL

NOTES:

1- Details shown on No. 16 Layout, Sheet 1, are typical for No. 10 or No. 20 Layouts except as indicated on Sheet 2.

2- Where practicable, Spring Sw. Mechanism must be installed on closed point side of switch. Where open point installation is required, mount Bracket, Item 23 on switch point side of No. 4 rod and connect crank as shown in Detail.

3- Mechanism and Tie Plate to be installed on same center line and must be parallel to gage of straight track.

4- To provide clearance for Front Rod or Point Lug, Switch Bolt 9-1/2 inches from point of switch may be removed.

5- To install switch adjustment bracket on Type MJ rods retain splice plate and attach bracket using four bolts, 3001-19. On other vertical rods remove one splice plate and attach bracket using four bolts, 3001-18.

6- Switch target lamps, when required, to be installed as directed by Signal Engineer.

7- Holes for drive spikes to be drilled in ties as follows:
1/2 X 5 inches for 21-C-361.
3/8 X 3 inches for 21-C-360.

8- Protective treatment-Point, Item 32, Instruction 350.

NOTES CONTINUED ON SHEET 2.

0 6 12 24 36
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH LAYOUT
HAND THROW SPRING SWITCH WITH FACING POINT LOCK

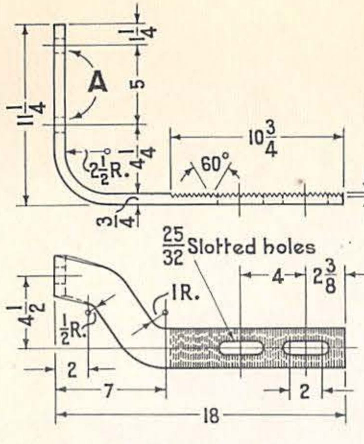
S-3250

ISSUED 8-19-64

SHEET 1 Cont'd. on Sh. 2

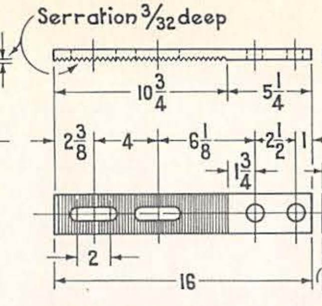
Printed in U.S.A.

Scale: ①



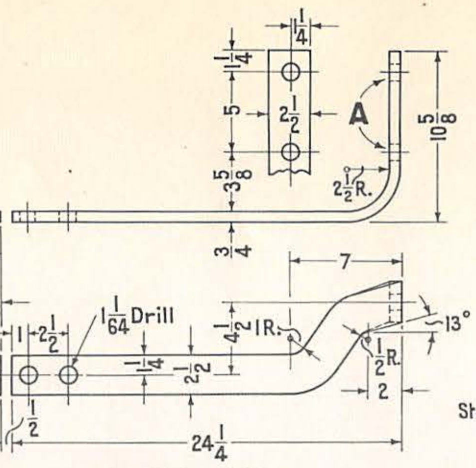
A
1¼
5
11¼
4¼
2½R.
60°
10¾
3/4
25/32 Slotted holes
1R.
½R.
4½
4
2⅜
2
7
2
18

3001-11 LUG
C1020 Steel Forged



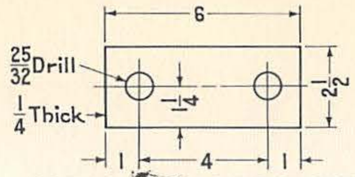
Serration 3/32 deep
10¾
5¼
2⅜
4
6⅛
2½
1
1¼
2
16

3001-13 CENTER PC.
C1020 Steel Forged



1/4
1¼
5
2½
A
5
10⅝
3⅝
2½R.
3/4
7
1 1/64 Drill
1
2½
4½
1R.
13°
1¼
2½
1½R.
2
½
24¼

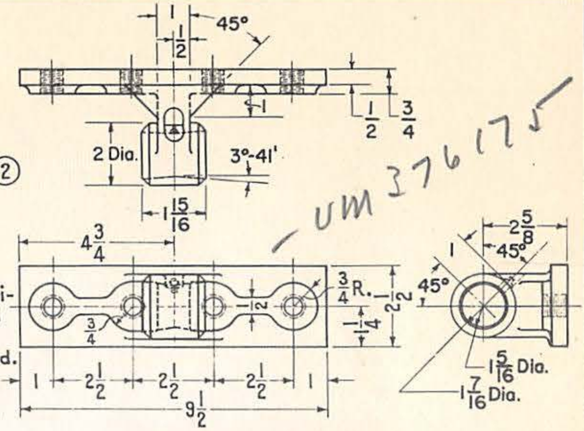
3001-12 LUG
C1020 Steel Forged



6
25/32 Drill
1/4 Thick
1¼
2½
1
4
1

3001-15 STRAP WASHER
C1020 Steel

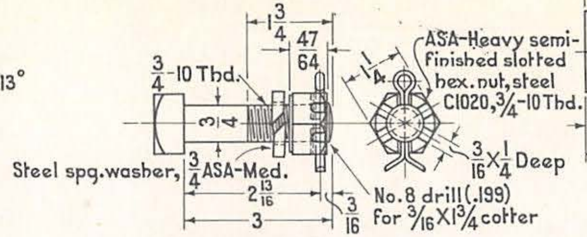
Scale: ②



1
½
45°
½
¾
2 Dia.
3°-41'
1 15/16
4¾
2⅝
45°
¾R.
½
2½
1¼
3/4
1
2½
2½
2½
1
9½
45°
1 5/16 Dia.
1 7/16 Dia.

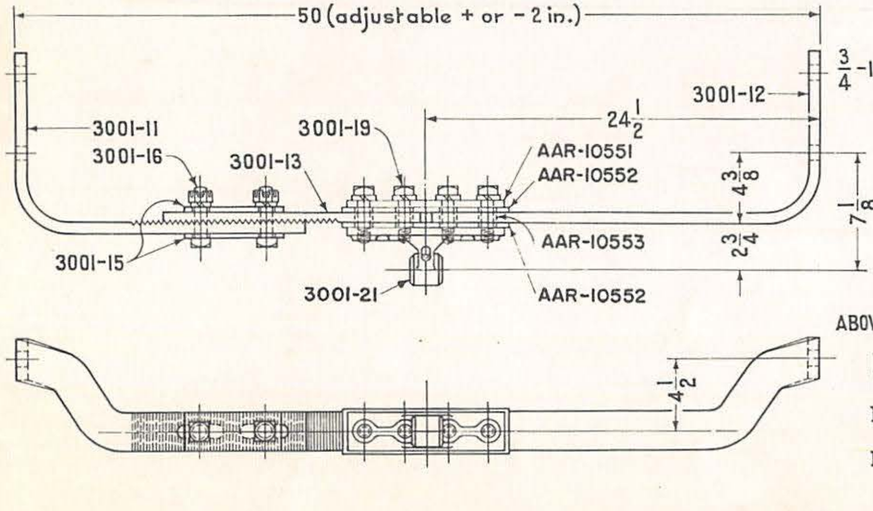
– UM 376175

3001-21 BRACKET
Steel-ASTM-A27-46T, Grade 65-30



1¾
47/64
3/4-10 Thd.
3/4
1/4
ASA-Heavy semi-finished slotted hex. nut, steel C1020, 3/4-10 Thd.
3/16 X ¼ Deep
Steel spg. washer, 3/4 ASA-Med.
2 13/16
3
3/16
No. 8 drill (.199) for 3/16 X 1¾ cotter

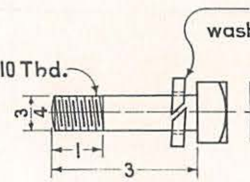
3001-16 BOLT COMPL.
ASA-Heavy unfinished sq. hd. bolt – Steel C1020



50 (adjustable + or – 2 in.)
3001-12
3001-11
3001-16
3001-13
3001-19
24½
AAR-10551
AAR-10552
4⅜
7⅛
2¾
3001-15
AAR-10553
3001-21
AAR-10552
4½

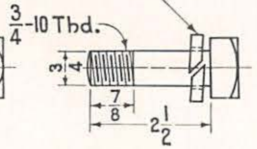
3001-2 FRONT ROD COMPL. FOR 112-127 AND 131 LB. RAIL – DRILLING A = 1 1/16
3001-3 " " " " 105 AND 115 LB. RAIL – DRILLING A = 13/16

Scale: ③



Steel spring washer ASA 3/4 Medium
3/4-10 Thd.
3/4
1
3

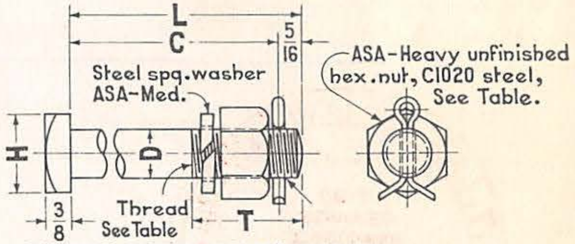
3001-18 BOLT COMPL.
For applying G.R.S. switch adjusting bracket 46948-12, Gr. 1, or bracket 3001-20 to vertical No. 1 Rod.



3/4-10 Thd.
3/4
7/8
2½

3001-19 BOLT COMPL.

ABOVE: ASA-Heavy unfinished sq. hd. bolts with special length thread, steel C1020.



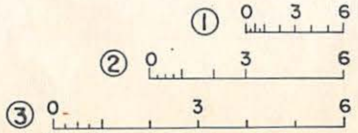
L
C
5/16
Steel spg. washer ASA-Med.
ASA-Heavy unfinished hex. nut, C1020 steel, See Table.
H
D
3/8
Thread See Table
T

SWITCH POINT BOLTS COMPL.
ASA-Regular unfinished sq. hd. bolts except with thin thread.
Bolts in following table shall be heat treated per N.Y.C.S., E.C. Plan G-35C.

ITEM	D	L	C	H	T		COTTER	RAIL
					LENGTH	THREAD		
U	1	4	3 11/16	1½	2¼	1-8	¼X1¾	131-127 OR 112 LB.
V	1	4¾	4 7/16					
W	7/8	4	3 11/16	1 5/16	2	7/8-3	¼X1½	127 OR 112 LB.
X	7/8	4¾	1 7/16					
Y	¾	3½	3 3/16	1⅛	1¾	¾-10	¼X1¼	105 LB.
Z	¾	4¼	3 15/16					

DISPOSITION OF SWITCH POINT BOLTS:
First 2 holes in each point.
ITEMS: U-W-Y { To fasten point Lug or Front Rod to Switch Point.
ITEMS: V-X-Z { To fasten point Lug with Front Rod to Switch Point.

NOTE: Protective treatment – Primer, Item No. 31, Instruction 350.
External threads shall be ASA-UNC-2A with rounded root throughout.
Internal threads shall be ASA-UNC-2B.



① 0 3 6
② 0 3 6
③ 0 3 6

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
FRONT RODS
FOR SINGLE SWITCH

Approved J. J. Corcoran
Chief Signal Engineer

S-3001

Printed in U.S.A.

ISSUED 6-1-54

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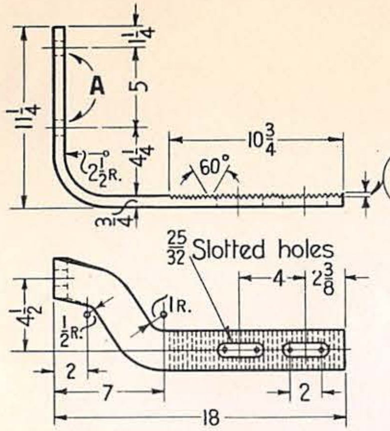
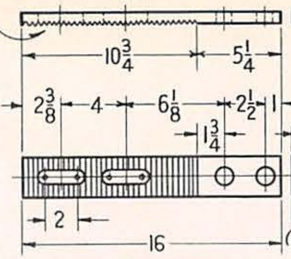

A
5
1¼
11¼
2½R.
60°
10¾
4½
¾
25/32 Slotted holes
1R.
½R.
4
2⅜
2
7
2
18

3001-11 LUG

C1020 Steel forged

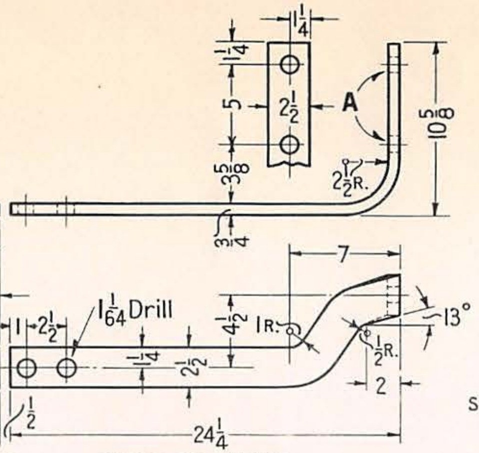
Scale: ①

Serration 3/32 deep


10¾
5¼
2⅜
4
6⅛
2½
1
1¾
2
16

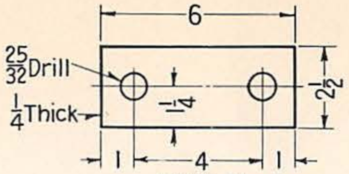
3001-13 CENTER PC.

C1020 Steel forged


1¼
1¼
5
2½
A
10⅝
3⅝
2½R.
¾
7
1 1/64 Drill
1
2½
4½
1R.
1¼
2½
½R.
13°
2
½
24¼

3001-12 LUG

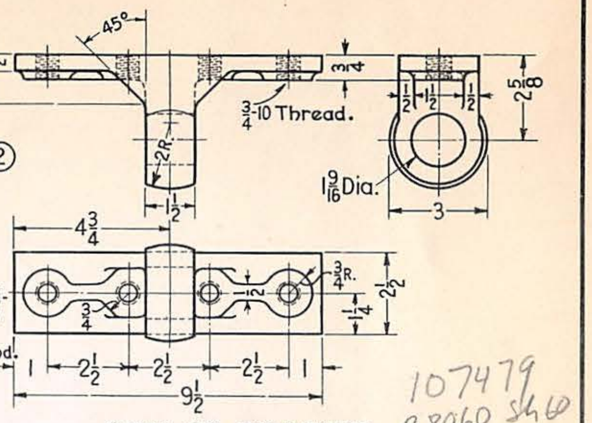
C1020 Steel forged


6
25/32 Drill
¼ Thick
1¼
2½
1
4
1

C1020 Steel

3001-15 STRAP WASHER

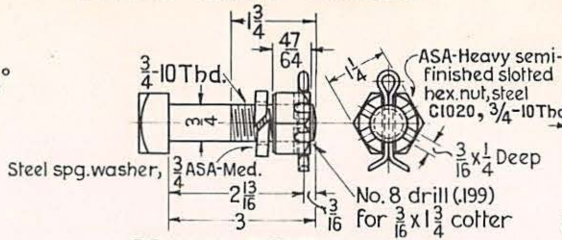
Scale: ②


45°
½
¾
¾-10 Thread.
2R.
1½
½
½
½
2⅝
1 9/16 Dia.
3
4¾
¾R.
½
¾
1¼
2½
1
2½
2½
2½
1
9½

107479
B8060 Sh 60

3001-20 BRACKET

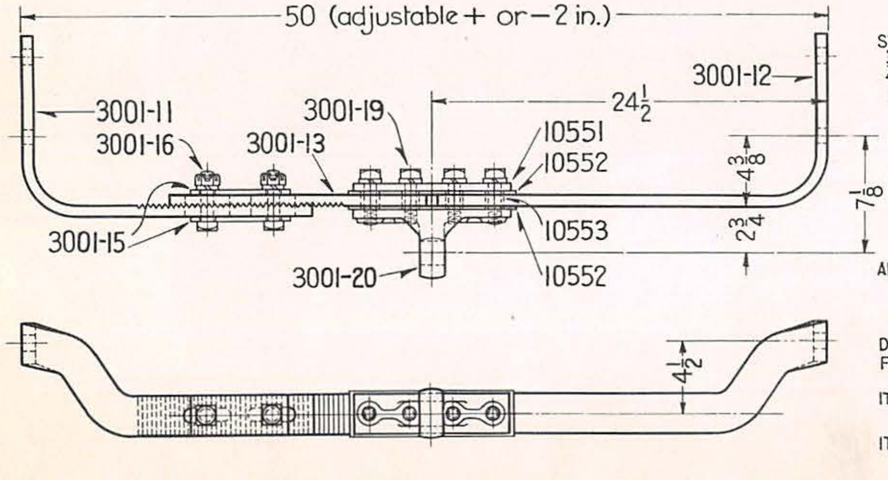
Steel — ASTM-A27-46T, Grade 65-30

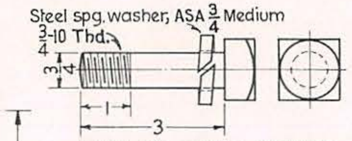

1¾
47/64
¾-10 Thd.
¾
1¼
ASA-Heavy semi-finished slotted hex. nut, steel C1020, ¾-10 Thd.
3/16 x ¼ Deep
Steel spg. washer, ¾ ASA-Med.
2 13/16
3
3/16
No. 8 drill (.199) for 3/16 x 1¾ cotter

3001-16 BOLT COMPL.

ASA-Heavy unfinished sq. hd. bolt — Steel C1020

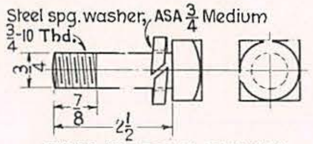
Scale: ③


50 (adjustable + or − 2 in.)
3001-12
3001-11
3001-19
24½
3001-16
3001-13
10551
10552
4⅜
7⅛
2¾
3001-15
10553
3001-20
10552
4½


Steel spg. washer, ASA ¾ Medium
¾-10 Thd.
¾
1
3

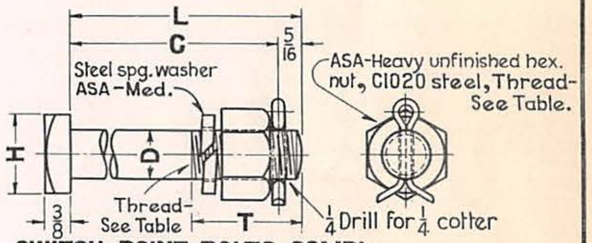
3001-18 BOLT COMPL.

For applying G.R.S. switch adjusting bracket 46948-12, Gr. 1, or bracket 3001-20 to vertical No. 1 Rod.


Steel spg. washer, ASA ¾ Medium
¾-10 Thd.
¾
7/8
2½

3001-19 BOLT COMPL.

ABOVE: ASA-Heavy unfinished sq. hd. bolts with special length thread, steel C1020.


L
C
5/16
Steel spg. washer ASA-Med.
ASA-Heavy unfinished hex. nut, C1020 steel, Thread - See Table.
H
D
3/8
Thread - See Table
T
¼ Drill for ¼ cotter

SWITCH POINT BOLTS COMPL.

ASA-Regular unfinished sq. hd. bolts except with thin head.

ITEM	D	L	C	H	T		COTTER	RAIL
					LENGTH	THREAD		
U	1	4	3 11/16	1½	2¼	1-8	¼ x 1¾	131-127 OR 112 LB.
V	1	4¾	4 7/16					
W	7/8	4	3 11/16	1 5/16	2	7/8-9	¼ x 1½	127 OR 112 LB.
X	7/8	4¾	4 7/16					
Y	¾	3½	3 3/16	1⅛	1¾	¾-10	¼ x 1¼	105 LB.
Z	¾	4¼	3 15/16					

DISPOSITION OF SWITCH POINT BOLTS:
First 2 holes in each point.

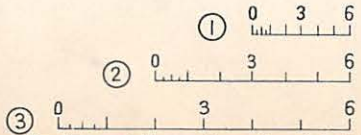
ITEMS: U-W-Y { To fasten point Lug or Front Rod to Switch Point.

ITEMS: V-X-Z { To fasten point Lug with Front Rod to Switch Point.

NOTE:
Bolts in above table shall be heat treated per N.Y.C.S., E.C. Plan G-35C.

3001-1 FRONT ROD COMPL. FOR 112 AND 127 LB. RAIL — DRILLING **A** = 15/16 228166 B7955 sh 495
3001-2 " " " " 112 — 127 AND 131 LB. RAIL — DRILLING **A** = 1 1/16 214404 B7955 sh 495
3001-3 " " " " 105 AND 115 LB. RAIL — DRILLING **A** = 13/16 213973 " "

NOTE: Protective treatment shall be in accordance with Instruction 350.
External threads shall be ASA-UNC-2A with rounded root throughout.
Internal threads shall be ASA-UNC-2B.


① 0 3 6
② 0 3 6
③ 0 3 6

Scales and dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

FRONT RODS
FOR SINGLE SWITCH

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3001D

12-9-1938
12-17-1940
5-15-1946
9-15-1951

Approved by Representatives of Lines shown.
Chairman

(Printed in U.S.A.)

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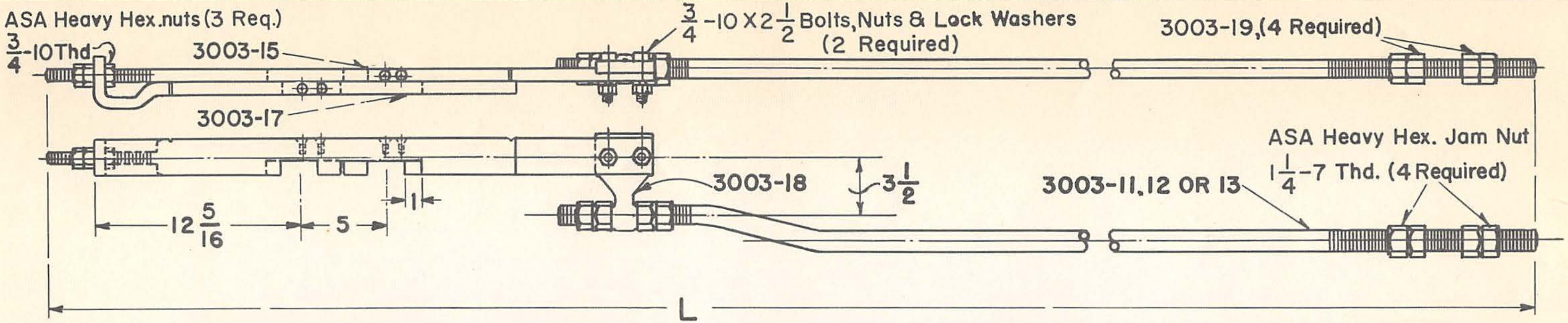
JUN 16 1952
SPECIFICATION DEPT.


ASA Heavy Hex.nuts (3 Req.)
3/4-10Thd
3003-15
3003-17
3/4-10 X 2 1/2 Bolts, Nuts & Lock Washers (2 Required)
3003-19, (4 Required)
ASA Heavy Hex. Jam Nut 1 1/4-7 Thd. (4 Required)
3003-18
3 1/2
3003-11, 12 OR 13
12 5/16
5
1
L

LOCK ROD, COMPLETE WITH 3/4 & 1-1/4 NUTS			L	USE GRS 5A OR 5C SWITCH MACHINE					
L.H. WITH LOCK PLATE 3003-16 ORDER NO.	R.H. WITH LOCK PLATE 3003-17 ORDER NO.	ROD		WEIGHT OF RAIL	DISTANCE TO GAUGE	TIE REFERENCE		LAYOUT	REMARKS
						R. H.	L. H.		
3003-1	3003-2	3003-11	8'-0 3/4"	127-112-105	45"	3009-11	3009-12	3000	CHAMFER
						3009-13	3009-13	3000	PLAIN
3003-3	3003-4	3003-12	7'-3 3/4"	127	36"	3019-11	3019-13	3010	C'FER-FRAME 4"
						3019-15	3019-15	3010	PLAIN-FRAME 4"
3003-5	3003-6	3003-13	7'-3 3/4	112-105	36"	3019-12	3019-14	3010	C'FER-FRAME 5"
						3019-16	3019-16	3010	PLAIN-FRAME 5"

NOTES:

1. Assembly shown for R.H. switch. For L.H. switch use Lock Plate 3003-16 and attach Lug 3003-18 to opposite side of 3003-15.
2. Assembly shown for 5 in. throw and may be adjusted from 3 1/2 to 6 in. throw.
3. All nuts to be C-1020, shall be hot forged, cold trimmed normalized, chamfered and faced.
4. Protective treatment-Primer, Item 31, Instruction 350.
5. External threads shall be ASA-UNC-2A with rounded root throughout.
   Internal threads shall be ASA-UNC-2B.

0 6 12 24

All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SEMI-ARTICULATED LOCK ROD
GRS MODEL 5A OR 5C SWITCH MACHINE ASSEMBLY

Approved
Chief Signal Engineer

S-3003

Printed in U.S.A.

ISSUED 6-1-54
SHEET 1 OF 2

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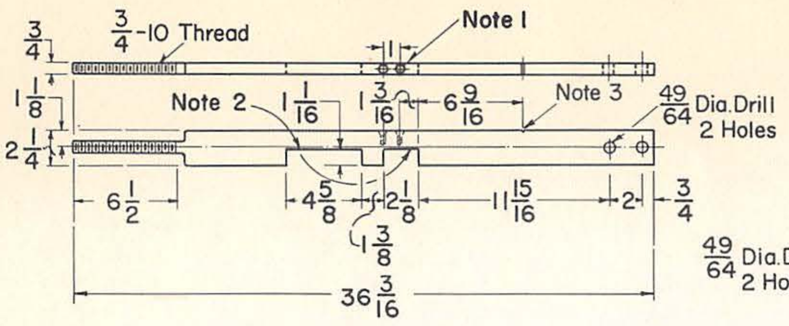
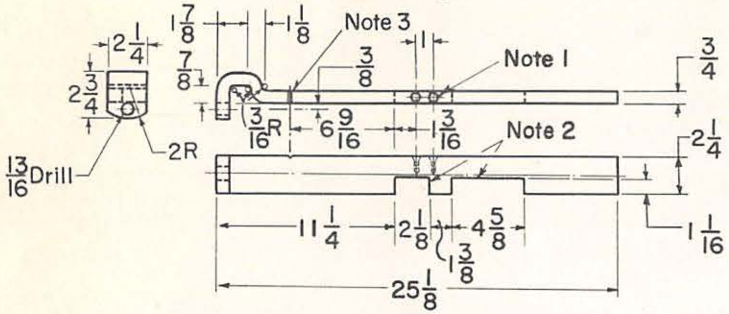


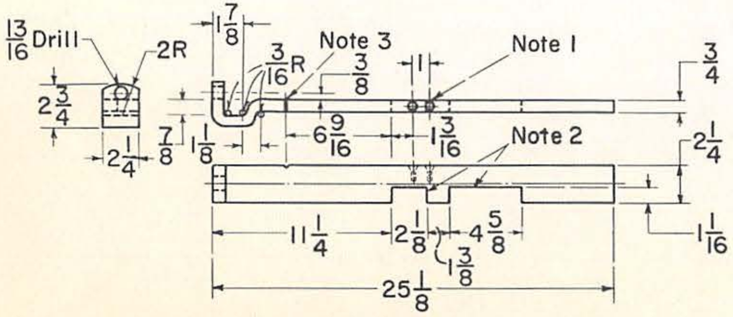
3/4 -10 Thread
Note 1
Note 2
Note 3
49/64 Dia. Drill 2 Holes
36 3/16
6 1/2
4 5/8
2 1/8
1 3/8
11 15/16

3003-15 THROUGH PLATE
C1020 Steel forged



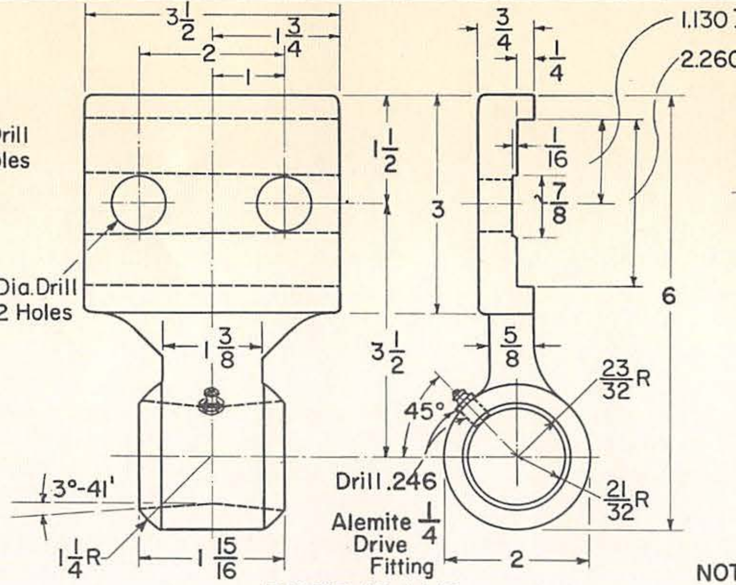
Note 3
Note 1
Note 2
13/16 Drill
2R
3/16 R
6 9/16
1 3/16
11 1/4
2 1/8
4 5/8
25 1/8

3003-16 L. H. LOCK PLATE
C1020 Steel forged



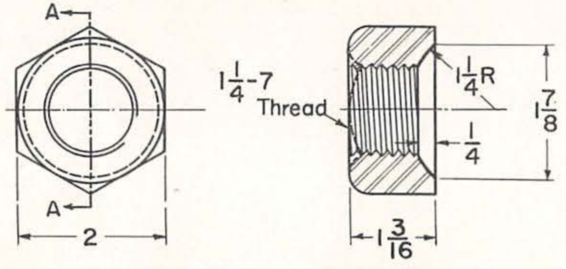
13/16 Drill
2R
Note 3
Note 1
Note 2
3/16 R
6 9/16
1 3/16
11 1/4
2 1/8
4 5/8
25 1/8

3003-17 R.H. LOCK PLATE
C1020 Steel forged



1.130 +.0025 -.0000
2.260 +.005 -.000
49/64 Dia. Drill 2 Holes
3°-41'
1 1/4 R
45°
Drill .246
Alemite 1/4 Drive Fitting
23/32 R
21/32 R
1 15/16

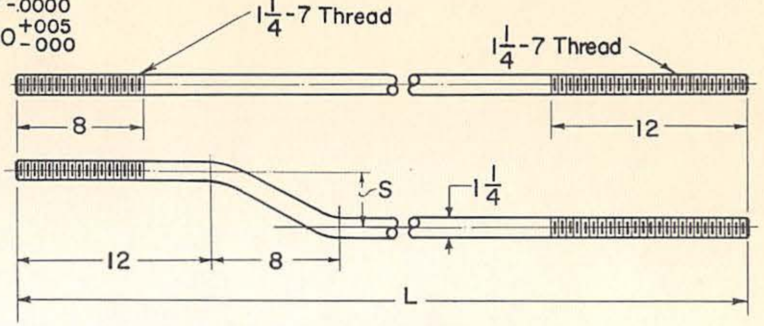
3003-18 LUG
Steel ASTM-A27-46T, Grade 65-30



A
A
1 1/4 -7 Thread
1/4 R
1 7/8
1 3/16
2

Section AA

3003-19 CUP NUT
C1020 Steel



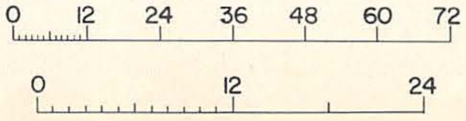
1 1/4 -7 Thread
1 1/4 -7 Thread
8
12
S
1 1/4
12
8
L

ROD ONLY
C1020 Steel forged

3003-11	L=67"	S=1-1/2"
3003-12	L=58"	S=2-1/2"
3003-13	L=58"	S=3-1/2"

NOTES:

1. Tap $\frac{5}{16}$ -18 X $\frac{5}{8}$ Thd. csk. 82° to $\frac{3}{8}$ dia, center line of holes must be parallel with side of plate.
2. Locking notches must be accurate to dimensions, free from burrs and have straight edges.
3. Locating notches $\frac{1}{32}$ deep, $\frac{1}{32}$ wide.
4. All nuts to be C1020, shall be hot forged, cold trimmed, normalized, chamfered and faced.
5. Protective treatment - Primer, Item 31, Instruction 350.
6. External threads shall be ASA-UNC-2A with rounded root throughout.
Internal threads shall be ASA-UNC-2B.



0
12
24
36
48
60
72
0
12
24

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SEMI-ARTICULATED LOCK ROD
GRS MODEL 5A OR 5C SWITCH MACHINE
DETAILS

Approved J. Corcoran
Chief Signal Engineer

S-3003

Printed in U.S.A.

ISSUED 6-1-54
SHEET 2 OF 2

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JUL 19 1954
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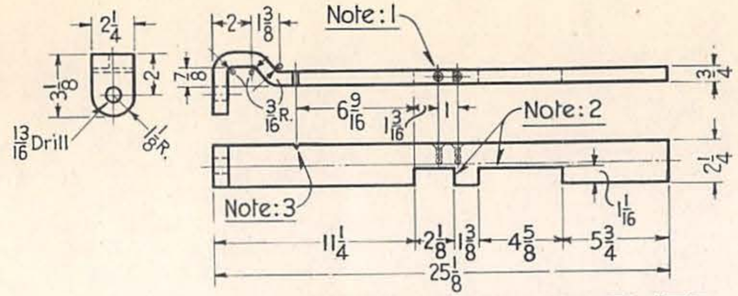
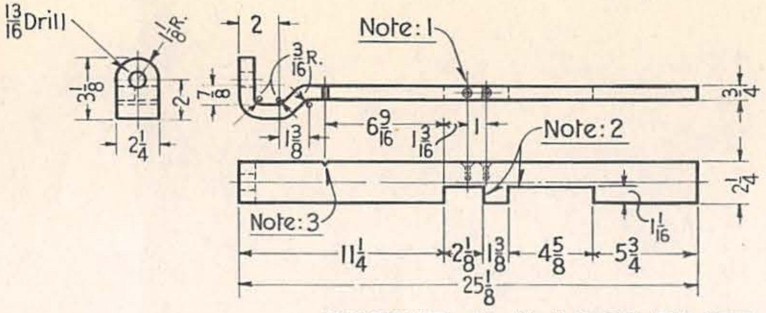
SERVICES
DEPT.
ORD. SECT.


2¼
2
1⅜
13/16 Drill
1/8 R.
Note: 1
7/8
2
3/16 R.
6 9/16
1 3/16
1
Note: 2
3/4
2¼
Note: 3
1 1/16
11¼
2⅛
1⅜
4⅝
5¾
25⅛

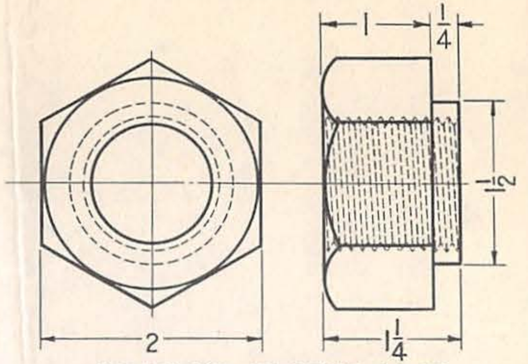
3003-16 L. H. LOCK PLATE

C1020 Steel forged


13/16 Drill
1/8 R.
1⅜
2
2¼
2
7/8
3/16 R.
Note: 1
6 9/16
1 3/16
1
1⅜
Note: 2
3/4
2¼
Note: 3
1 1/16
11¼
2⅛
1⅜
4⅝
5¾
25⅛

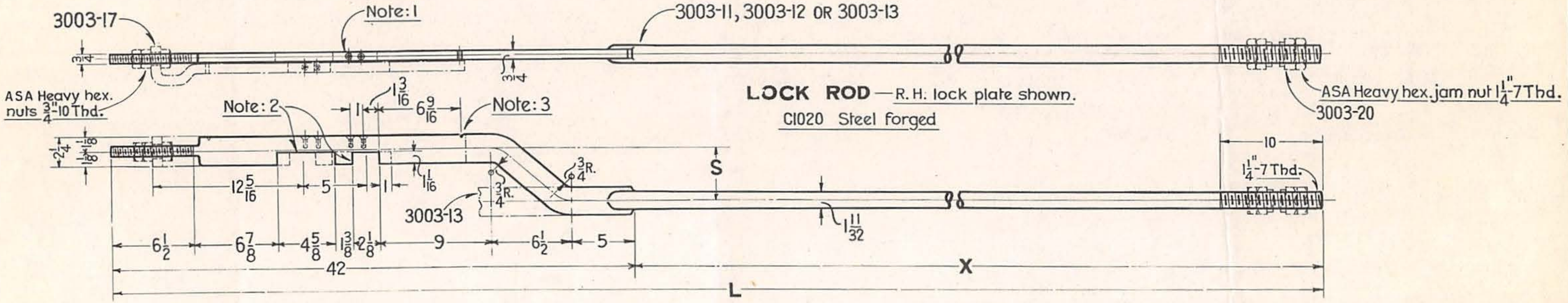
3003-17 R. H. LOCK PLATE

C1020 Steel forged



3003-20 SLEEVE NUT

ASA Heavy hex. nut 1¼"-7 Thd.—machined


3003-17
Note: 1
3003-11, 3003-12 OR 3003-13
3/4
3/4
ASA Heavy hex. nuts 3/4"-10 Thd.
ASA Heavy hex. jam nut 1¼"-7 Thd.
3003-20
Note: 2
1 3/16
6 9/16
Note: 3
1
2¼
1⅛
1⅛
12 5/16
5
1
1 1/16
3/4 R.
3003-13
3/4 R.
S
10
1¼"-7 Thd.
1 11/32
6½
6⅞
4⅝
1⅜
2⅛
9
6½
5
42
X
L

LOCK ROD—R. H. lock plate shown.

C1020 Steel forged

LOCK ROD COMPL.		LOCK ROD ONLY				USE					
L.H.-WITH LOCK PLATE 3003-16, 3/4 AND 1¼ NUTS	R.H.-WITH LOCK PLATE 3003-17, 3/4 AND 1¼ NUTS	WITHOUT LOCK PLATES, 3/4 OR 1¼ NUTS				WEIGHT OF RAIL	G.R.S. MOD. 5A SWITCH MACHIME				
							DIST. FROM GAUGE	TIE REFERENCE		LAY-OUT	REMARKS
ORDER NO.	ORDER NO.	ORDER NO.	L	X	S			R.H.	L.H.		
3003-1	3003-2	3003-11	8'-0¾"	4'-6¾"	4 15/16"	127-112-105	45"	3009-11 3009-13	3009-12 3009-13	3000 3000	CHAMFER PLAIN
3003-3	3003-4	3003-12	7'-3¾"	3'-9¾"	15/16"	127	36"	3019-11 3019-15	3019-13 3019-15	3010 3010	C'FER-FRAME 4" PLAIN-FRAME 4"
3003-5	3003-6	3003-13	7'-3¾"	3'-9¾"	0"	112-105	36"	3019-12 3019-16	3019-14 3019-16	3010 3010	C'FER-FRAME 5" PLAIN-FRAME 5"

NOTES:

1. Tap 5/16"-18 × 5/8 Thd. csk. 82° to 3/8 dia., center line of holes must be parallel with side of plate.
2. Locking notches must be accurate to dimensions free from burrs and have straight edges.
3. Locating notches 1/32 deep, 1/32 wide.
4. Assembly shown for 5 in. throw and may be adjusted from 3½ in. to 6 in. throw.
5. All nuts to be — C1020, shall be hot forged, cold trimmed, normalized, chamfered and faced.
6. Protective treatment shall be in accordance with Instruction 350.
7. External threads shall be ASA-UNC-2A with rounded root throughout.
   Internal threads shall be ASA-UNC-2B.

0 3 6 9 12

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3003B

12-12-1948
3-15-1951

LOCK RODS

G.R.S. MOD. 5A SWITCH MACHINE

127-112-105 LB. RAIL

Approved by Representatives of Lines shown

J. J. Corcoran

Chairman

Printed in U.S.A.

SPECIFICATION DEPT.
NOV 8 1937
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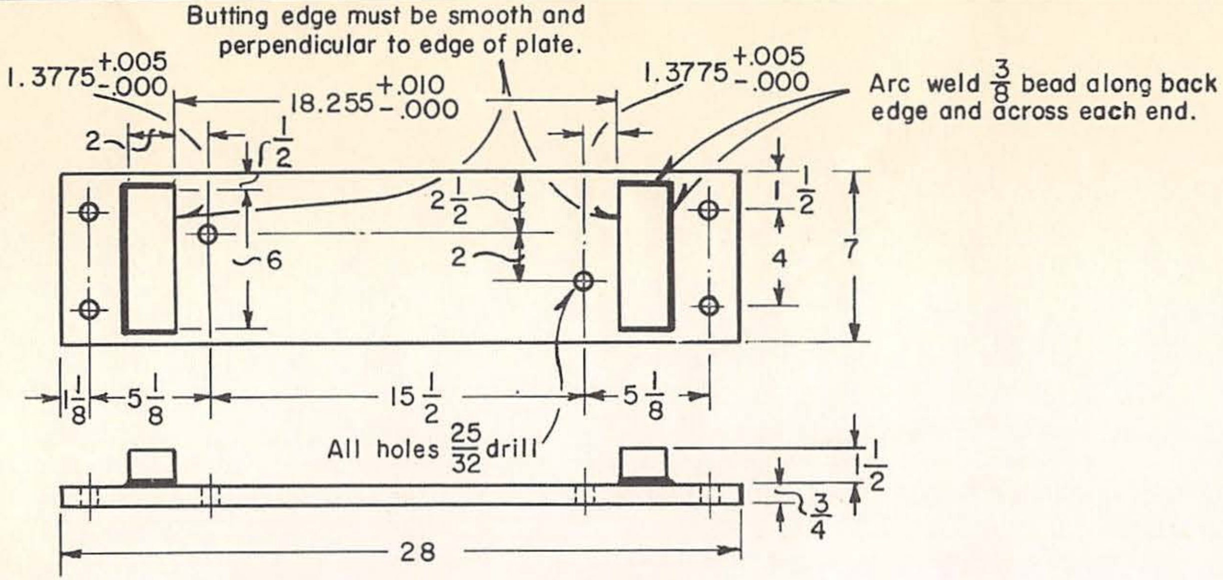
Butting edge must be smooth and perpendicular to edge of plate.
1.3775 +.005 -.000
18.255 +.010 -.000
1.3775 +.005 -.000
Arc weld 3/8 bead along back edge and across each end.
2
1/2
2 1/2
2
6
1 1/2
4
7
1 1/8
5 1/8
15 1/2
5 1/8
All holes 25/32 drill
1 1/2
3/4
28

3004-1, SADDLE PLATE COMPLETE

C-1020 Steel - For Layout 3000

Note:

Protective treatment - Primer, Item 31, Instruction 350.

0 6 12 24

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL DEPARTMENT

SADDLE PLATE

FOR GRS 5A OR 5C SWITCH MACHINE

Approved - Corcoran
Chief Signal Engineer

S-3004

Printed in U.S.A.

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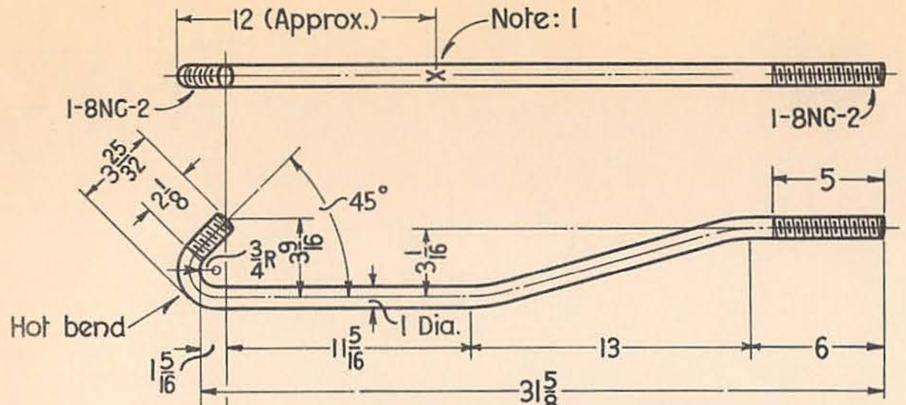
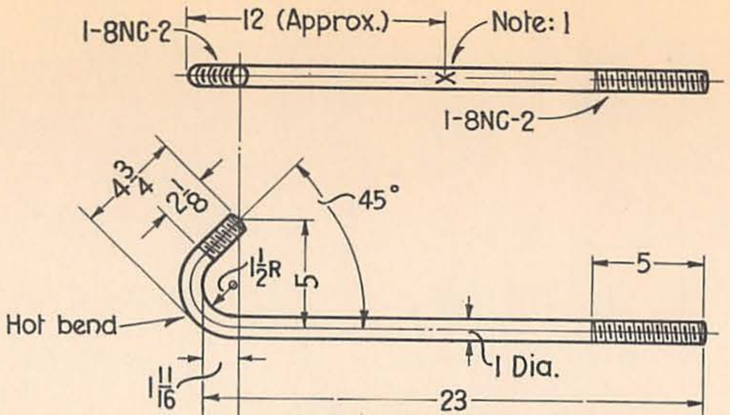
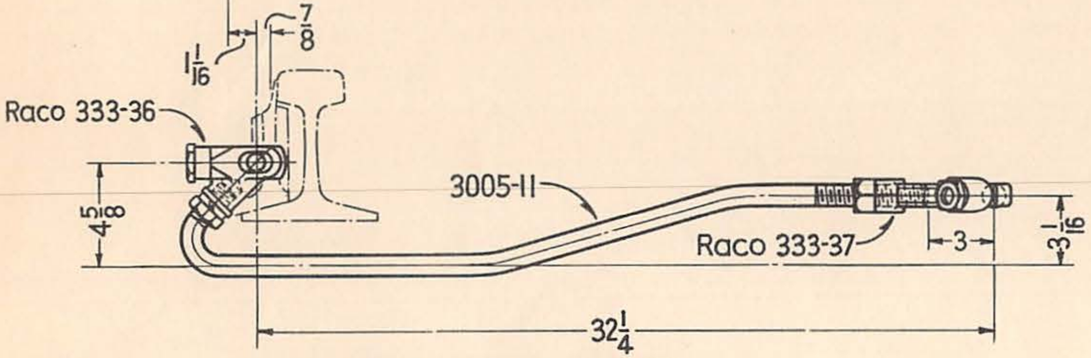
ORD. SEC.


12 (Approx.)
Note: 1
1-8NC-2
1-8NC-2
3 25/32
2 1/8
45°
5
3/4 R
3 9/16
3 1/16
Hot bend
1 Dia.
1 5/16
11 5/16
13
6
31 5/8

3005-11 ROD ONLY

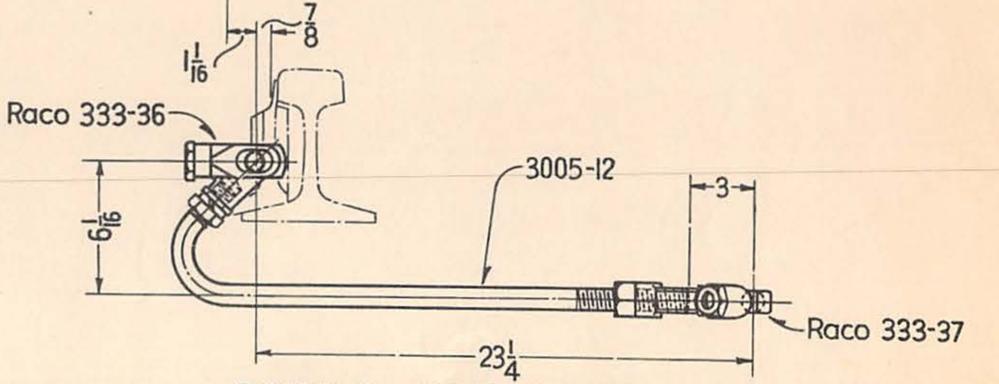

1-8NC-2
12 (Approx.)
Note: 1
1-8NC-2
4 3/4
2 1/8
45°
1 1/2 R
5
5
Hot bend
1 Dia.
1 11/16
23

3005-12 ROD ONLY


1 1/16
7/8
Raco 333-36
3005-11
4 5/8
Raco 333-37
3
3 1/16
32 1/4

3005-1 ROD COMPL.

For Layout 3000
Switch machine ties unframed


1 1/16
7/8
Raco 333-36
3005-12
3
6 1/16
Raco 333-37
23 1/4

3005-2 ROD COMPL.

For Layout 3010
Switch machine ties framed either 4 or 5 inches

NOTES:

1. Manufacturer's identification to be stamped on each rod at 'X'.
2. Protective treatment shall be in accordance with Instruction 350.
3. All rods to be of SAE-1020 steel without weld.
4. See 3006 for switch circuit controller and point-detector rod fittings.

0 3 6 9 12
Scale and dimensions given in inches

Plan rev'd 5-18-38 and renumbered 3005 was No. 3080 Issue: 1 (7-30-36)

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

3005

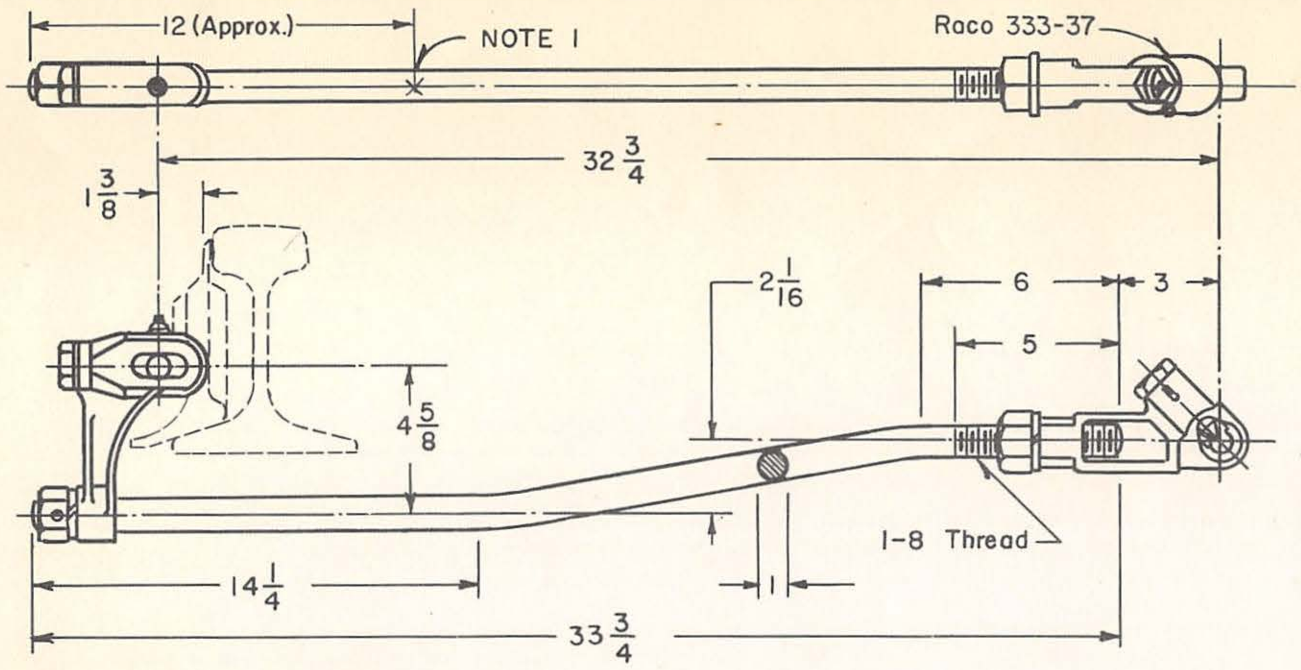
1	1-18-1939
2	3-6-1941

POINT-DETECTOR RODS

FOR G.R.S. MOD. 5A SWITCH MACHINE

Approved by Representatives of Lines shown.

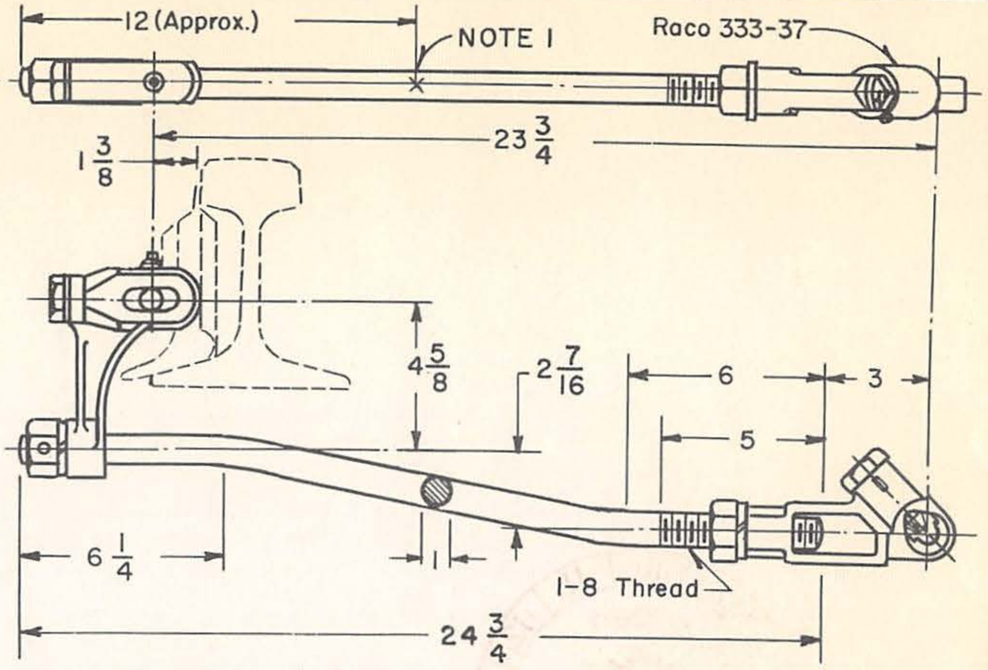
Chairman


12 (Approx.)
NOTE 1
Raco 333-37
32 3/4
1 3/8
2 1/16
6
3
5
4 5/8
1-8 Thread
14 1/4
1
33 3/4

3005-1, ROD COMPLETE

3005-11, ROD AND POINT SOCKET ASSEMBLY ONLY.

FOR LAYOUT 3000


12 (Approx.)
NOTE 1
Raco 333-37
23 3/4
1 3/8
4 5/8
2 7/16
6
3
5
6 1/4
1
1-8 Thread
24 3/4

3005-2, ROD COMPLETE

3005-12, ROD AND POINT SOCKET ASSEMBLY ONLY.

WITH SWITCH MACHINE TIES FRAMED EITHER 4 OR 5 INCHES.

NOTES:

1. Manufacturer's identification to be stamped on each rod at X.
2. Rods are for Layouts shown; for lengths other than as shown, specify rod number and length required.
3. All rods to be of 1335 steel without weld.
4. Rods must not be welded or reformed after manufacture.
5. Portions which have been subjected to forging operations to be normalized.
6. Protective treatment - Primer, Item 31, Instruction 350.
7. External threads shall be ASA-UNC-2A with rounded root throughout.
   Internal threads shall be ASA-UNC-2B.

0 6 12 18

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
POINT DETECTOR RODS
FOR G. R. S. 5A OR 5C SWITCH MACHINES

Approved ....
Chief Signal Engineer

S-3005

Printed in U. S. A.

ISSUED 6-1-54

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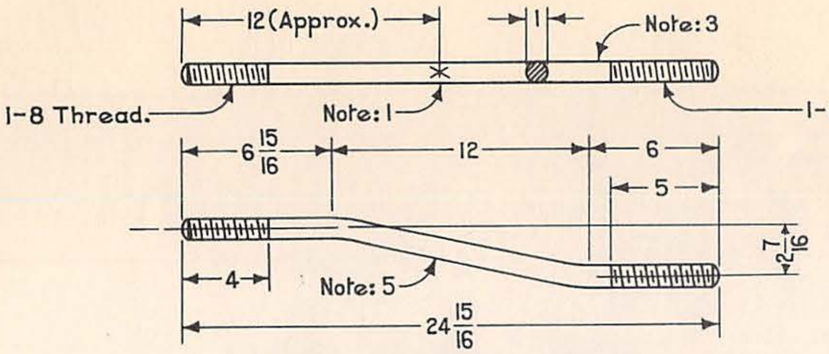
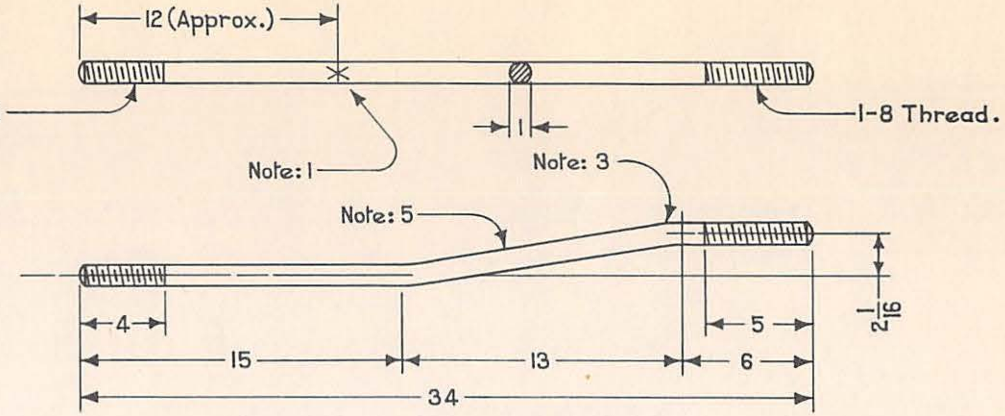
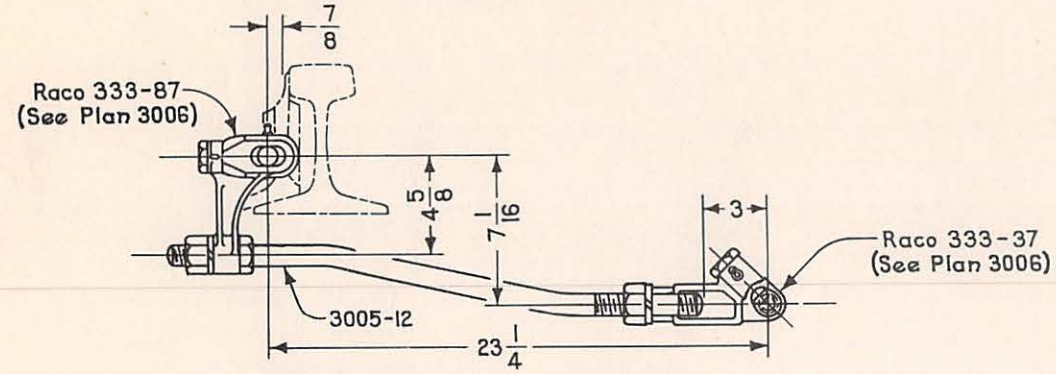
ORD. SECT.
1 2 3 4 5 6 7 8 9 10 11 12


12 (Approx.)
1
Note: 3
1-8 Thread.
Note: 1
1-8 Thread
6 15/16
12
6
5
2 7/16
4
Note: 5
24 15/16

3005-12 ROD ONLY

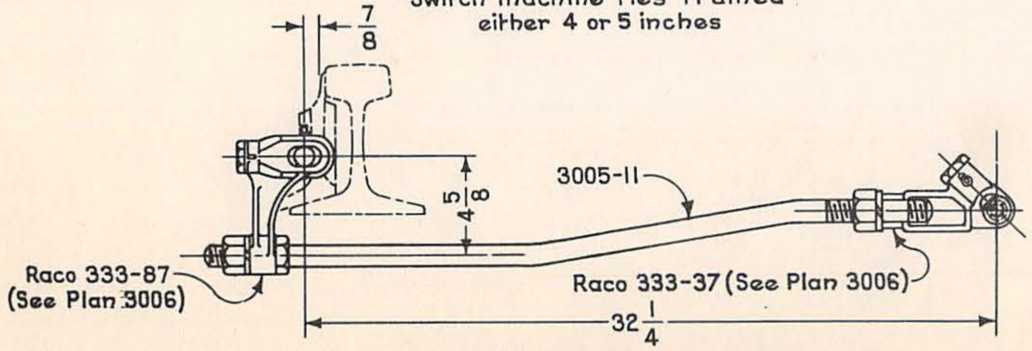

12 (Approx.)
1-8 Thread
1-8 Thread.
1
Note: 1
Note: 3
Note: 5
4
5
2 1/16
15
13
6
34

3005-11 ROD ONLY


7/8
Raco 333-87 (See Plan 3006)
4 5/8
7 1/16
3
Raco 333-37 (See Plan 3006)
3005-12
23 1/4

3005-2 ROD COMPL.

Switch machine ties framed
either 4 or 5 inches


7/8
4 5/8
3005-11
Raco 333-87 (See Plan 3006)
Raco 333-37 (See Plan 3006)
32 1/4

3005-1 ROD COMPL.

For Layout 3000

NOTES:

1. Manufacturer's identification to be stamped on each rod at "X."
2. Rods are for Layouts shown; for lengths other than as shown, specify rod number and length required.
3. All rods to be of 1335 steel without weld.
4. Rods must not be welded or reformed after manufacture.
5. Portions which have been subjected to forging operations to be normalized.
6. See 3006 for switch circuit controller and point-detector rod fittings.
7. Protective treatment shall be in accordance with Instruction 350.
8. External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.

0 3 6 9 12 inches.

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3005D

1-18-1939
3-6-1941
4-8-1946
1-25-1951

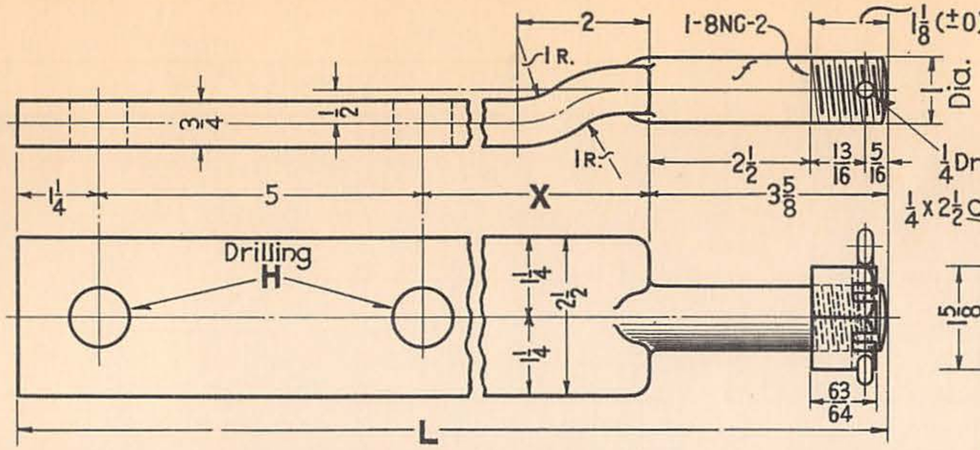
POINT-DETECTOR RODS

FOR G.R.S. MOD. 5A SWITCH MACHINE

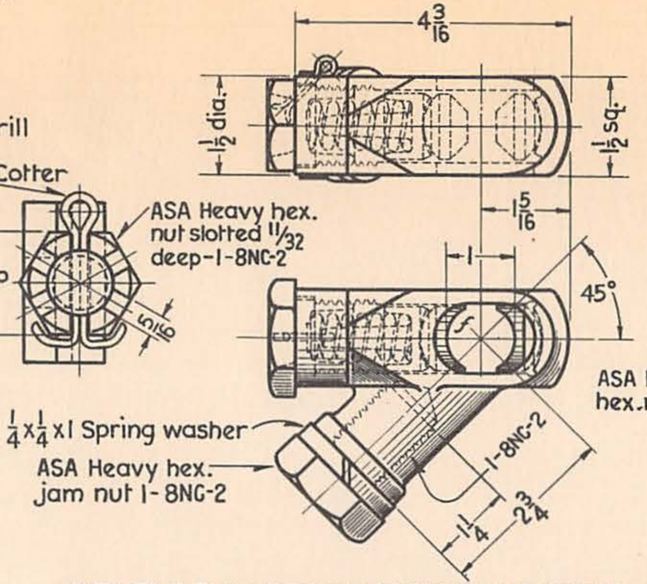
Approved by Representatives of lines shown.

Chairman.

Printed in U.S.A.

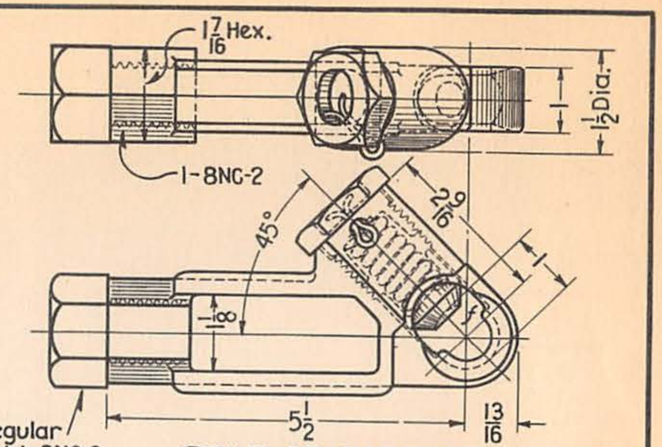

2
1 R.
1-8NC-2
1 1/8 (±0)
1 Dia.
3/4
1/2
1 R.
2 1/2
13/16
5/16
1/4 Drill
1 1/4
5
X
3 5/8
1/4 x 2 1/2 Cotter
Drilling
H
1 1/4
2 1/2
1 1/4
63/64
L

POINT LUG COMPL. With ASA nut and cotter	POINT LUG ONLY SAE-1020 Steel Forged				WEIGHT OF RAIL	USE
ORDER NO.	ORD.NO.	X	L	H		
3006-1	3006-11	8	17 7/8	15/16	127-112	Interlocked switches
3006-3	3006-13	8	17 7/8	13/16	105	
3006-4	3006-14	3 1/2	13 3/8	15/16	127-112	Hand thrown switches
3006-6	3006-16	3 1/2	13 3/8	13/16	105	


4 3/16
1 1/2 dia.
1 1/2 sq.
ASA Heavy hex. nut slotted 11/32 deep-1-8NC-2
1 5/8
5/16
1 5/16
1
45°
1/4 x 1/4 x 1 Spring washer
ASA Heavy hex. jam nut 1-8NC-2
1-8NC-2
1 1/4
2 3/4

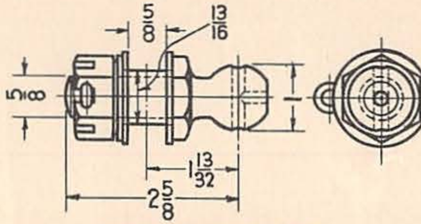
SELF-ADJUSTING POINT SOCKET COMPL.

Mall. I.—Raco No. 333-36 or equivalent.


1 7/16 Hex.
1 1/2 Dia.
1-8NC-2
2 9/16
45°
1
1 1/8
5 1/2
13/16
ASA Regular hex.nut 1-8NC-2

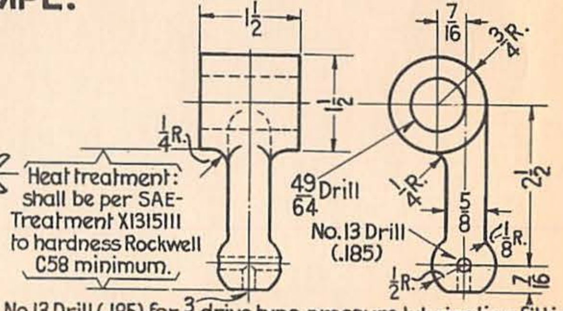
SELF-ADJUSTING CONTROLLER-ARM SOCKET COMPLETE

Mall. I.—Raco No. 333-37 or equivalent


5/8
13/16
5/8
1
1 13/32
2 5/8

INSULATING BALL-STUD COMPL.

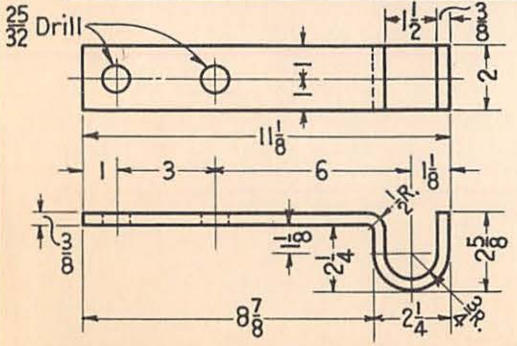
A.A.R.—12711


1 1/2
7/16
3/4 R.
1 1/2
1/4 R.
Heat treatment: shall be per SAE-Treatment X1315111 to hardness Rockwell C58 minimum.
49/64 Drill
1/4 R.
5/8
2 1/2
No.13 Drill (.185)
1/8 R.
1/2 R.
7/16

No.13 Drill (.185) for 3/16 drive type pressure lubricating fitting

3006-21 POINT-DETECTOR ROD BALL-STUD LUG

SAE-X1315


25/32 Drill
1 1/2
3/8
1
2
11 1/8
1
3
6
1 1/8
3/8
1/2 R.
1/8
2 1/4
2 5/8
8 7/8
2 1/4
13/16 R.

3006-25 GUIDE

SAE-1020 Steel

Superseded by plan dated 11/3/41

0 3 6

0 3 6

Scales: and dimensions given in inches

NOTES:

Protective treatment shall be in accordance with Instruction 350.

All nuts to be SAE-1020, shall be hot forged, cold trimmed, normalized, chamfered and faced.

Plan revised 11-18-38
and renumbered 3006
Issue: 1, was old No.
5930 Issue: 1 8-20-36

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

SWITCH CIRCUIT CONTROLLER AND POINT-DETECTOR ROD FITTINGS

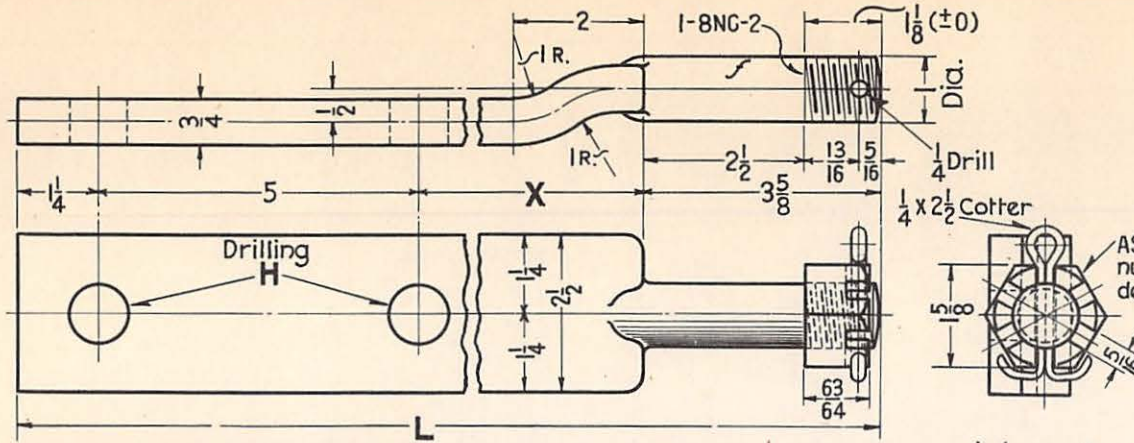
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

3006

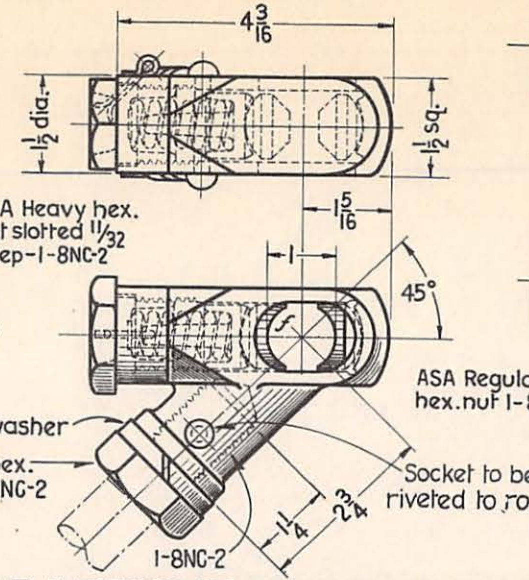
1	12-9-1938
2	3-6-1941

Approved by Representatives of Lines shown.

Chairman

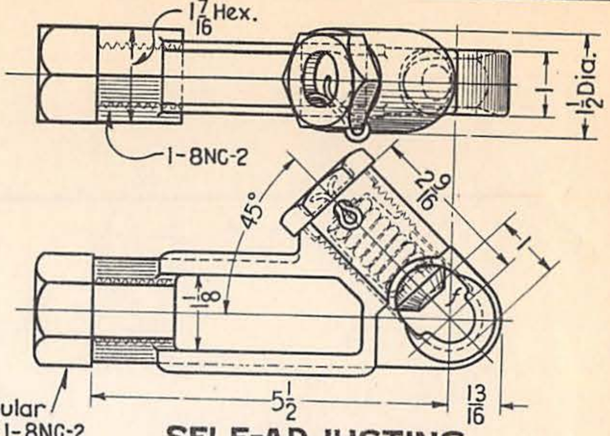

2
1-8NC-2
1 1/8 (±0)
1 R.
1 Dia.
3/4
1/2
1 R.
2 1/2
13/16
5/16
1/4 Drill
1 1/4
5
X
3 5/8
1/4 x 2 1/2 Cotter
ASA Heavy hex. nut slotted 11/32 deep-1-8NC-2
Drilling H
1 1/4
2 1/2
1 1/4
1 5/8
5/16
63/64
L

POINT LUG COMPL. With ASA nut and cotter	POINT LUG ONLY SAE-1020 Steel forged				WEIGHT OF RAIL	USE
ORDER NO.	ORD. NO.	X	L	H		
3006-1	3006-11	8	17 7/8	15/16	127-112	Interlocked switches
3006-3	3006-13	8	17 7/8	13/16	105	
3006-4	3006-14	3 1/2	13 3/8	15/16	127-112	Hand thrown switches
3006-6	3006-16	3 1/2	13 3/8	13/16	105	


4 3/16
1 1/2 dia.
1 1/2 sq.
1 5/16
1
45°
1/4 x 1/4 x 1 Spring washer
ASA Heavy hex. jam nut 1-8NC-2
Socket to be riveted to rod
1-8NC-2
1 1/4
2 3/4

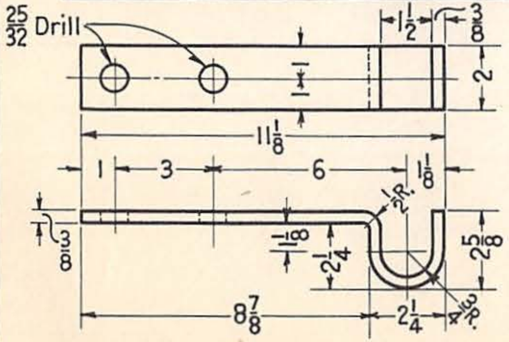
SELF-ADJUSTING POINT SOCKET COMPL.

Mall. I.—Raco No. 333-36 or equivalent.


1 7/16 Hex.
1-8NC-2
1
1 1/2 Dia.
2 9/16
45°
1
1 1/8
ASA Regular hex. nut 1-8NC-2
5 1/2
13/16

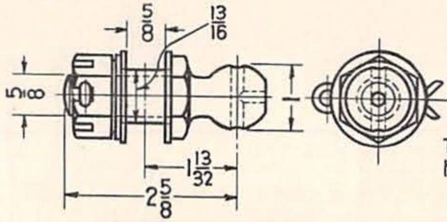
SELF-ADJUSTING CONTROLLER-ARM SOCKET COMPLETE

Mall. I.—Raco No. 333-37 or equivalent


25/32 Drill
1 1/2
3/8
1
2
11 1/8
1
3
6
1 1/8
2 R.
3/8
1 1/8
2 1/4
2 5/8
8 7/8
2 1/4
3/8

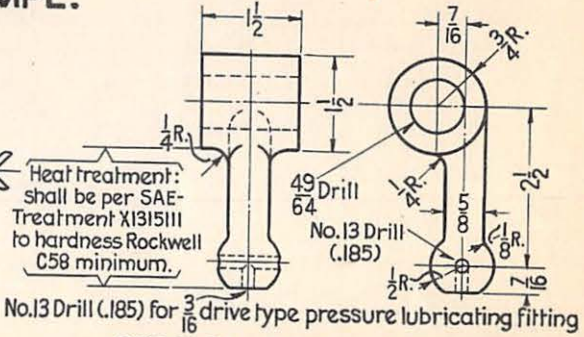
3006-25 GUIDE

SAE-1020 Steel


5/8
13/16
5/8
1
1 13/32
2 5/8

INSULATING BALL-STUD COMPL.

A.A.R.—12711


1 1/2
7/16
3/4 R.
1/4 R.
1/2
Heat treatment: shall be per SAE-Treatment X1315111 to hardness Rockwell C58 minimum.
49/64 Drill
1/4 R.
5/8
No. 13 Drill (.185)
1/8 R.
2 1/2
1/2 R.
7/16
No. 13 Drill (.185) for 3/16 drive type pressure lubricating fitting

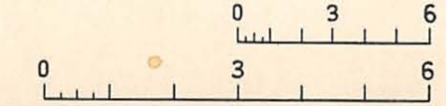
3006-21 POINT-DETECTOR ROD BALL-STUD LUG

SAE-X1315

NOTES:

Protective treatment shall be in accordance with Instruction 350.

All nuts to be SAE-1020, shall be hot forged, cold trimmed, normalized, chamfered and faced.



Scales: and dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

SWITCH CIRCUIT CONTROLLER AND POINT-DETECTOR ROD FITTINGS

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL. R.R.

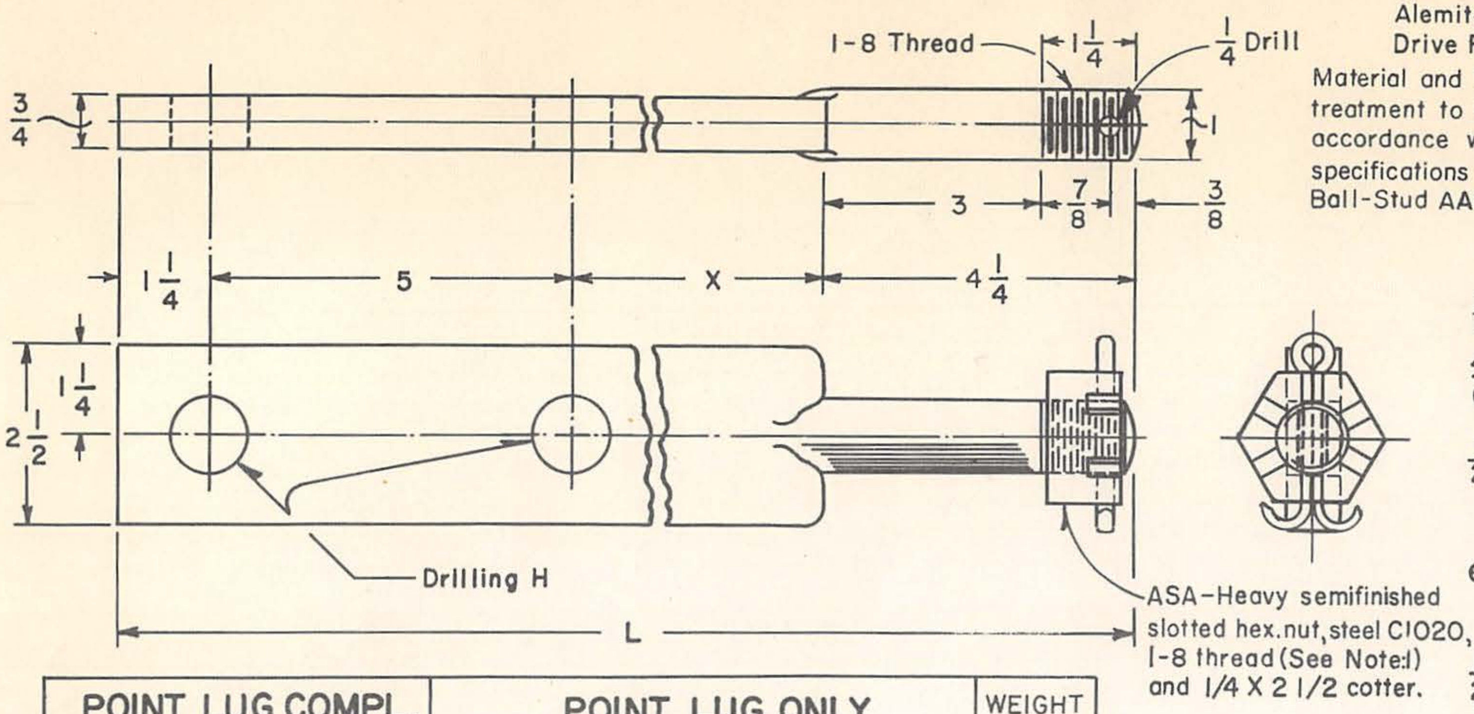
3006

12-9-1938
3-6-1941
11-3-1941

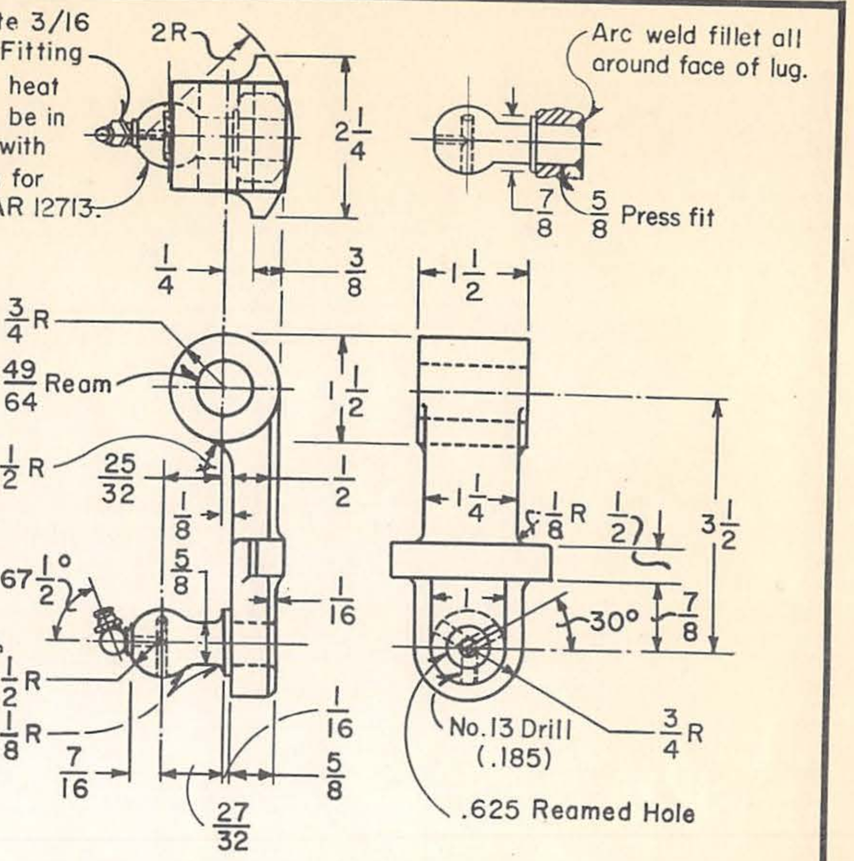
Approved by Representatives of Lines shown.

Chairman

Plan revised 11-18-38
and renumbered 3006
Issue: 1, was old No.
5930 Issue: 1 8-20-36


1-8 Thread
1 1/4
1/4 Drill
3/4
1
3
7/8
3/8
1 1/4
5
X
4 1/4
1 1/4
2 1/2
Drilling H
L
ASA-Heavy semifinished slotted hex.nut, steel C1020, 1-8 thread (See Note:1) and 1/4 X 2 1/2 cotter.

POINT LUG COMPL. With nut and cotter pin	POINT LUG ONLY C1020 Steel forged				WEIGHT OF RAIL
ORDER NO.	ORD. NO.	X	L	H	
3006-2	3006-12	8	18 1/2	1 1/16	131-127-112
3006-3	3006-13	8	18 1/2	13/16	105
3006-5	3006-15	3 1/2	14	1 1/16	131-127-112
3006-6	3006-16	3 1/2	14	13/16	105


Alemite 3/16 Drive Fitting
Material and heat treatment to be in accordance with specifications for Ball-Stud AAR 12713.
2R
2 1/4
Arc weld fillet all around face of lug.
7/8
5/8 Press fit
1/4
3/8
1 1/2
3/4 R
49/64 Ream
1 1/2
1/2 R
25/32
1/2
1/8
5/8
1 1/4
1/8 R
1/2
3 1/2
67 1/2°
1/16
1
30°
7/8
1/2 R
1/8 R
7/16
1/16
5/8
27/32
No.13 Drill (.185)
3/4 R
.625 Reamed Hole

3006-9 BALL-STUD LUG COMPL.

0 1 2 3 4 5 6

All dimensions given in inches.

NOTES: 1. External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.

2. Protective treatment - Primer, Item 31, Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
LUGS
FOR SWITCH CIRCUIT CONTROLLER AND POINT DETECTOR RODS

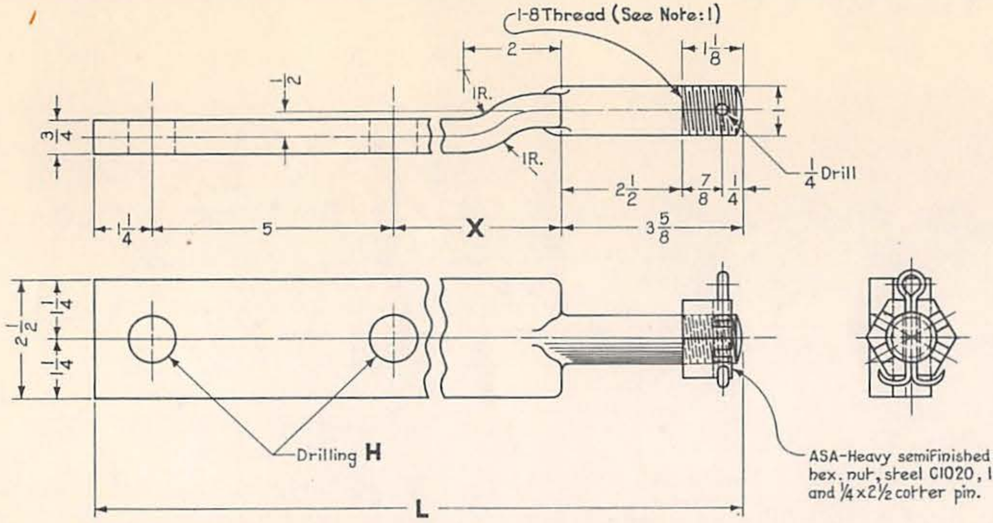
Approved J. Corcoran
Chief Signal Engineer

S-3006

Printed in U.S.A.

ISSUED 6-1-54

RECEIVED
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.


1-8 Thread (See Note: 1)
2
1 1/8
1/2
1R.
1R.
3/4
1
1/4 Drill
2 1/2
7/8
1/4
1 1/4
5
X
3 5/8
2 1/2
1 1/4
1 1/4
Drilling H
L
ASA-Heavy semifinished slotted hex. nut, steel C1020, 1-8 thread (See Note 1) and 1/4 x 2 1/2 cotter pin.

POINT LUG COMPL. With nut and cotter pin	POINT LUG ONLY C1020 Steel Forged				WEIGHT OF RAIL
ORDER NO.	ORD. NO.	X	L	H	
3006-2	3006-12	8	17 7/8	1 1/16	131-127 112
3006-3	3006-13	8	17 7/8	13/16	105
3006-5	3006-15	3 1/2	13 3/8	1 1/16	131-127 112
3006-6	3006-16	3 1/2	13 3/8	13/16	105

—FOR PRICE ONLY 177414

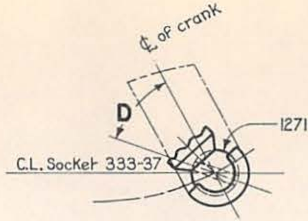
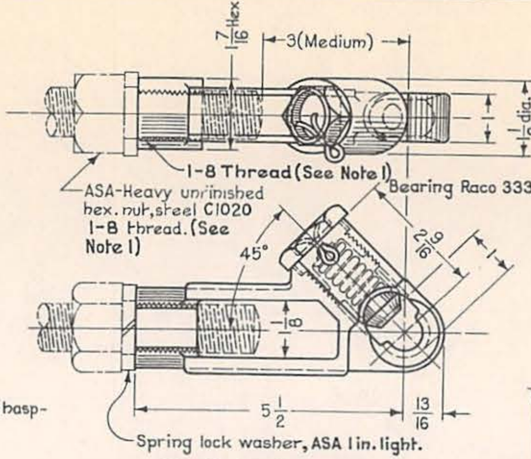

℄ of crank
D
12711
C.L. Socket 333-37

DIAGRAM SHOWING POSITION OF HOLE WITH C.L. OF CRANK

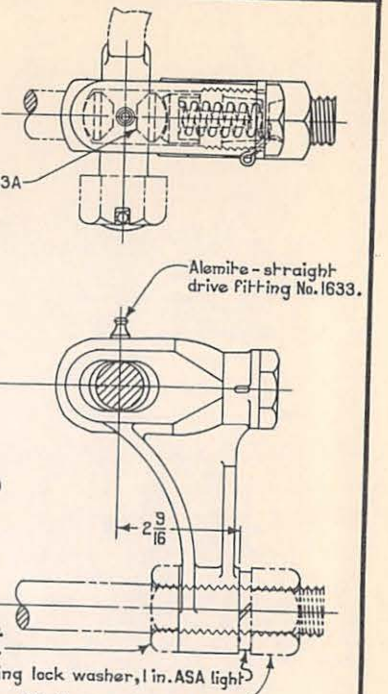
R.H. Assembly **D**=42°
L.H. Assembly **D**=84°

Right or left-hand is determined by facing front (hasp-end) of switch circuit controller.


7/16 Hex.
3 (Medium)
1-8 Thread (See Note 1)
ASA-Heavy unfinished hex. nut, steel C1020 1-8 thread. (See Note 1)
Bearing Raco 333-33A
45°
2 9/16
1
1 1/8
5 1/2
13/16
Spring lock washer, ASA 1 in. light.

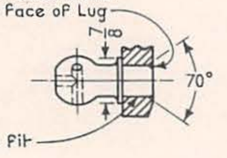
SELF-ADJUSTING CONTROLLER-ARM SOCKET

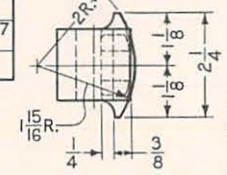
Mall. I.-Raco No. 333-37 or equivalent


1 1/2 dia.
Alemite-straight drive fitting No. 1633.
4 5/8
2 9/16
Spring lock washer, 1 in. ASA light
ASA-Heavy unfinished hex. nut. Steel C1020, 1-8 thread. (See Note 1)

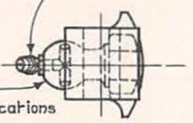
SELF-ADJUSTING POINT SOCKET COMPL.

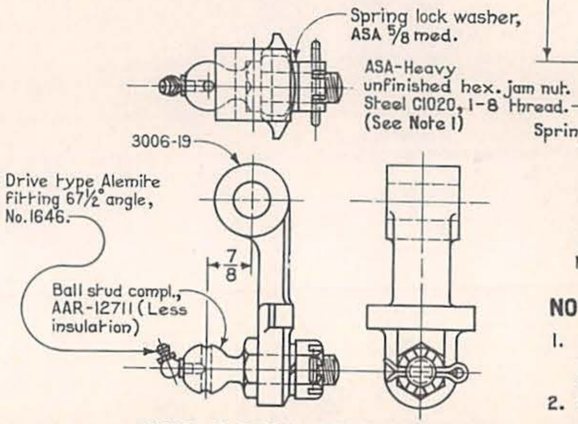
Mall. I.-Raco No. 333-87 or equivalent


Arc weld a fillet all around and grind flush with face of Lug
7/8
70°
5/8 Press fit


2R.
1/8
1/8
2 1/4
1 15/16 R.
1/4
3/8

Material and heat treatment to be in accordance with specifications for Ball-Stud A.A.R. 12713.


3/16 Drive type Alemite Fitting 67 1/2° angle, No. 1646.

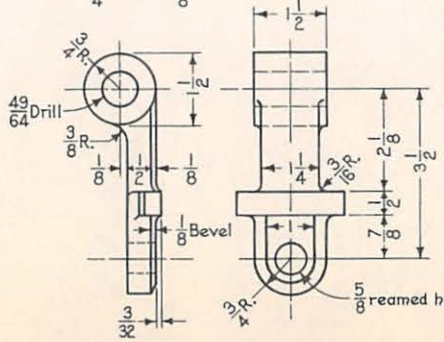

Spring lock washer, ASA 5/8 med.
ASA-Heavy unfinished hex. jam nut. Steel C1020, 1-8 thread. (See Note 1)
3006-19
7/8
Ball stud compl., AAR-12711 (Less insulation)

3006-8 BALL-STUD LUG COMPL.

As shown (with Ball-Stud)

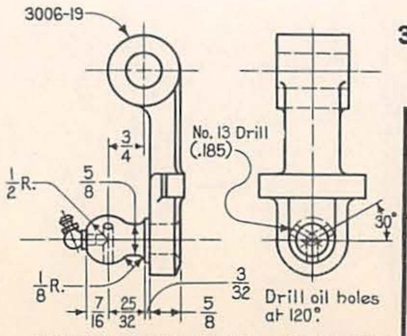
NOTE:

1. External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.
2. Spring lock washers to be carbon steel.


1 1/2
4 3/8 R.
1/2
49/64 Drill
3/8 R.
1/8
2
1/8
1 1/4
3/16 R.
2 1/8
3 1/2
1
1/8 Bevel
1/2
7/8
3/4 R.
5/8 reamed hole.
3/32

3006-19 BALL-STUD LUG

Cast Steel


3006-19
3/4
No. 13 Drill (.185)
1/2 R.
5/8
30°
1/8 R.
7/16
25/32
5/8
3/32
Drill oil holes at 120°

3006-9 BALL-STUD LUG COMPL.

As shown (with Ball-Stud)

0 1 2 3 4 5 6 inches

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

SWITCH CIRCUIT CONTROLLER AND POINT-DETECTOR ROD FITTINGS

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.

3006E

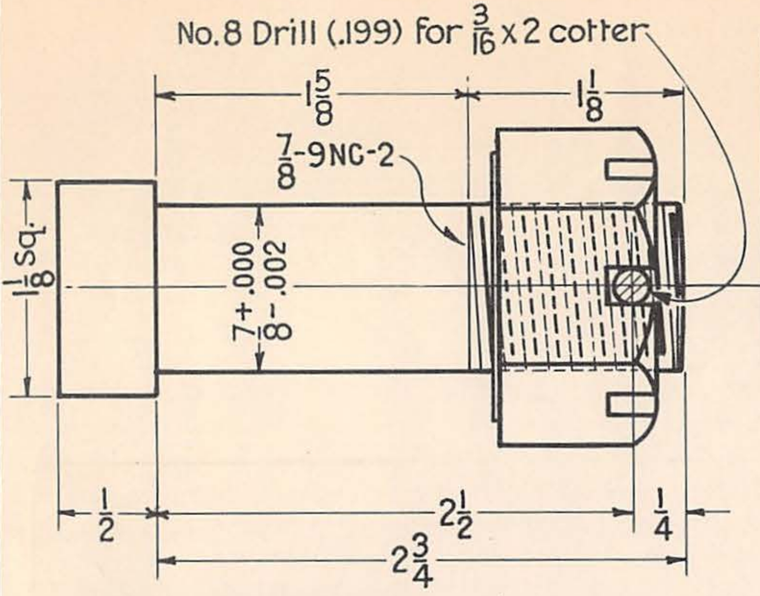
12-9-1938
3-6-1941
11-3-1941
4-8-1946
1-17-1951

Approved by Representatives of lines shown.

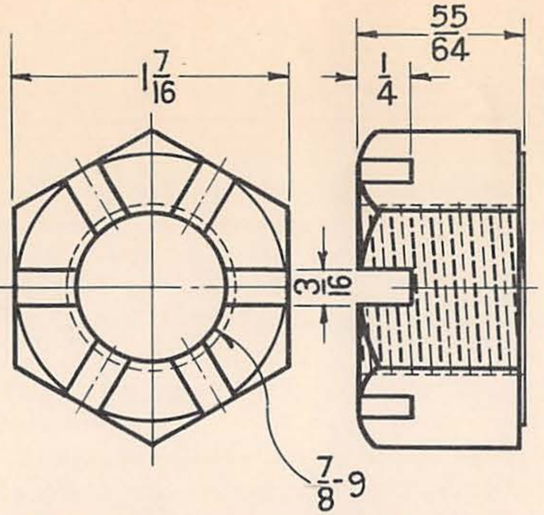
Chairman.

Printed in U.S.A.

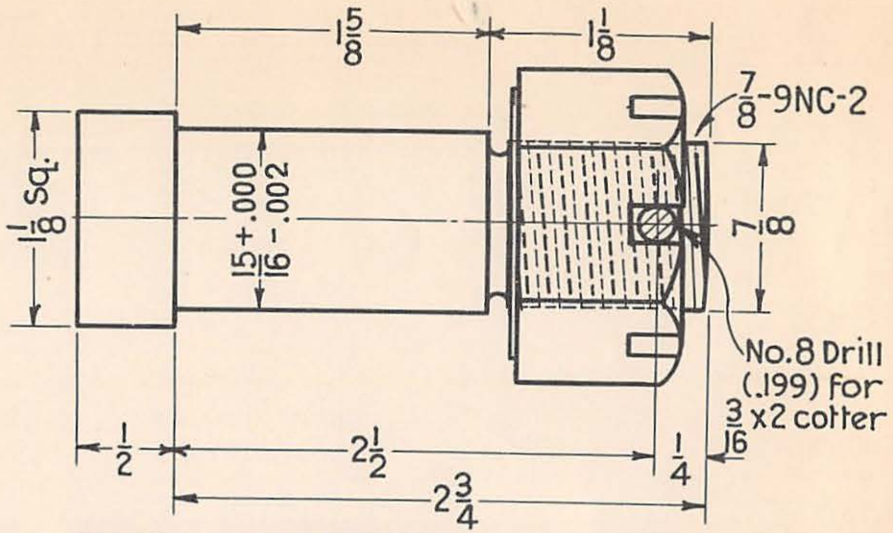
3007A (6-27-45)
Voids bolts formerly on 3002A of
12-7-1938


No.8 Drill (.199) for $\frac{3}{16}$ x 2 cotter
$1\frac{5}{8}$
$1\frac{1}{8}$
$\frac{7}{8}$-9NC-2
$1\frac{1}{8}$ sq.
$\frac{7}{8}$ +.000 -.002
$\frac{1}{2}$
$2\frac{1}{2}$
$\frac{1}{4}$
$2\frac{3}{4}$

3007-1 BOLT COMPL.– With nut and cotter.
SAE-1112 Turned cold drawn steel


$1\frac{7}{16}$
$\frac{55}{64}$
$\frac{1}{4}$
$\frac{3}{16}$
$\frac{7}{8}$-9

ASA-Heavy semifinished slotted hex. nut, steel SAE-1020, NC-2 thd.


$1\frac{5}{8}$
$1\frac{1}{8}$
$\frac{7}{8}$-9NC-2
$1\frac{1}{8}$ Sq.
$\frac{15}{16}$ +.000 -.002
$\frac{7}{8}$
No.8 Drill (.199) for $\frac{3}{16}$ x 2 cotter
$\frac{1}{2}$
$2\frac{1}{2}$
$\frac{1}{4}$
$2\frac{3}{4}$

3007-2 BOLT COMPL.– With nut and cotter.
SAE-1112 Turned cold drawn steel

NOTE: For replacement of 3007-1 where holes are worn and reamed for $\frac{15}{16}$ bolts.

0 1 2 3
Scale and all dimensions given in inches

NOTE:
Protective treatment shall be in accordance with Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

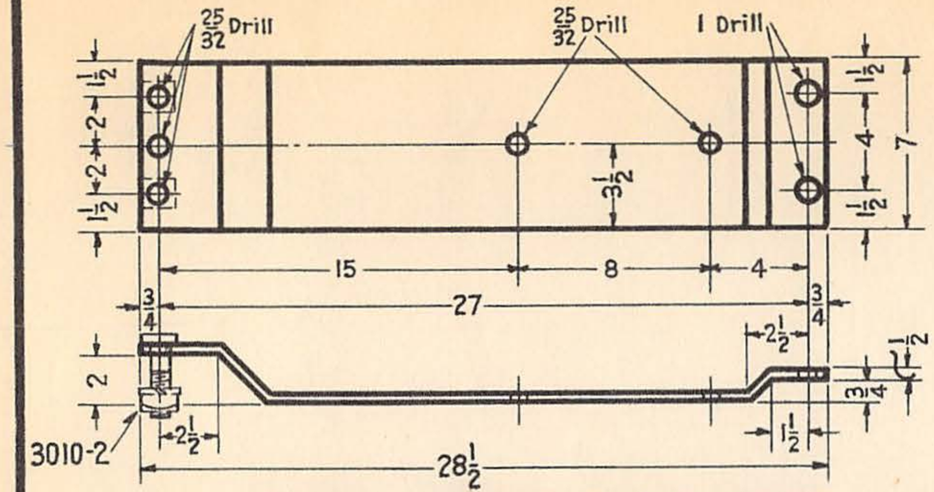
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3007A
6-27-1945

BOLTS

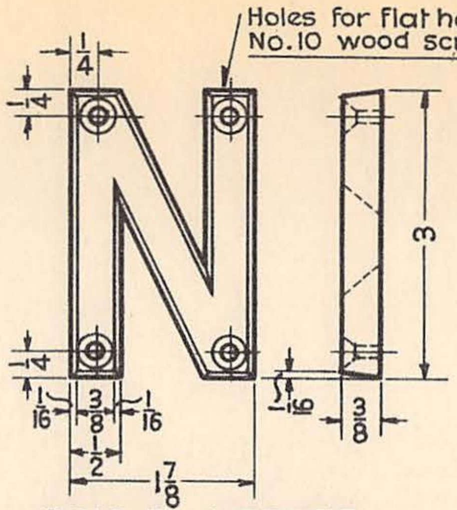
FOR CONNECTING THROW ROD TO SWITCH MACHINES

Approved by Representatives of Lines shown.
Chairman



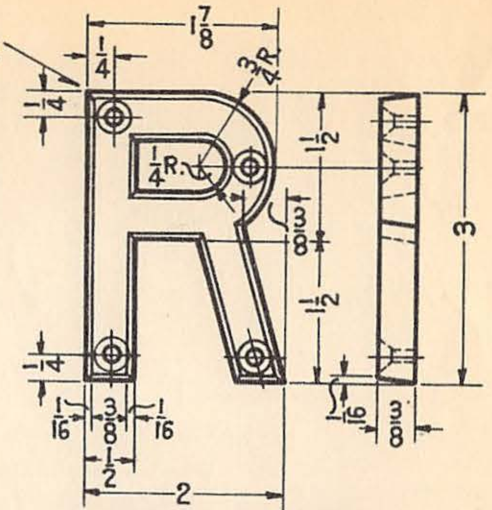
25/32 Drill
25/32 Drill
1 Drill
1 1/2
2
2
1 1/2
3 1/2
1 1/2
4
1 1/2
7
15
8
4
3/4
27
3/4
2 1/2
1/2
2
3/4
2 1/2
1 1/2
3010-2
28 1/2

3010-1 JOINING PLATE ONLY
3010-3 " " COMPL.-With 2 bolts
First made for switch layout 3000 - Mild steel



Holes for flat head No.10 wood screws
1/4
1/4
1/4
3
1/16
3/8
1/16
1/2
1 7/8
1/16
3/8

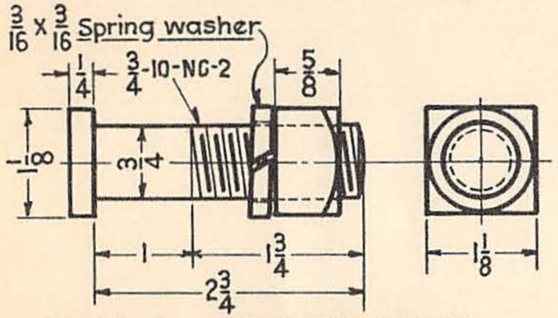
3010-5 LETTER
Cast iron



1 7/8
3/4 R.
1/4
1/4
1/4 R.
1 1/2
3/8
1 1/2
3
1/4
1/16
3/8
1/16
1/2
2
1/16
3/8

3010-6 LETTER
Cast iron

For indicating normal and reverse position of switch



3/16 x 3/16 Spring washer
1/4
3/4-10-NC-2
5/8
1 1/8
3/4
1
1 3/4
2 3/4
1 1/8

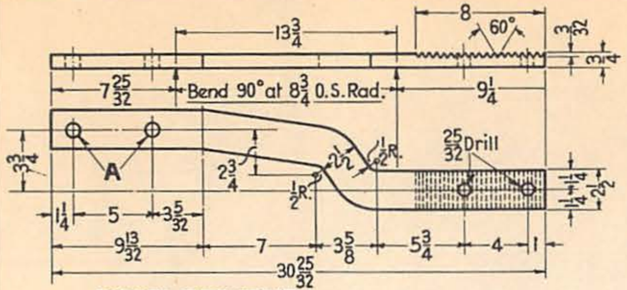
3010-2 JOINING BOLT
O. H. Steel

NOTE: When ordering parts give number and name shown in large type.

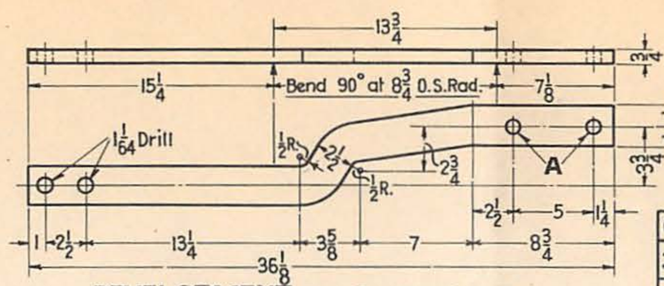
Scales: 1 1/2 in. and 6 in. = 1 ft.

All dimensions given in inches.

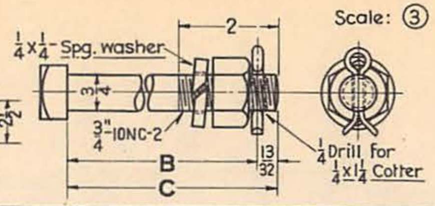
NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&ST.L.RY. B.&A.R.R. P.&L.E.R.R. RUTL.R.R.	**3010** ISSUE 1 DATE 2-4-1936
LETTERS **JOINING PLATE & BOLT**	Approved by Representatives of Lines shown. J C Mock Chairman	


13¾
8
60°
3/32
¾
7 25/32
Bend 90° at 8¾ O.S.Rad.
9¼
A
2¾
½R.
25/32 Drill
1/2 R.
3¾
1¼
5
3 5/32
9 13/32
7
3⅝
5¾
4
1
30 25/32

DEVELOPMENT FOR LEFT LUG END

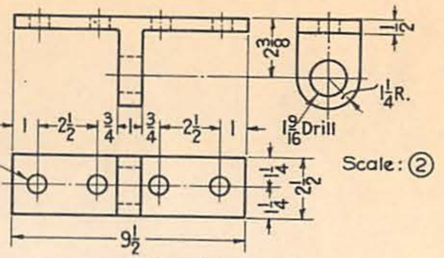

13¾
15¼
Bend 90° at 8¾ O.S.Rad.
7⅛
1 1/64 Drill
½R.
A
2¾
3¾
1
2½
13¼
3⅝
7
8¾
2½
5
1¼
36⅛

DEVELOPMENT FOR RIGHT LUG END

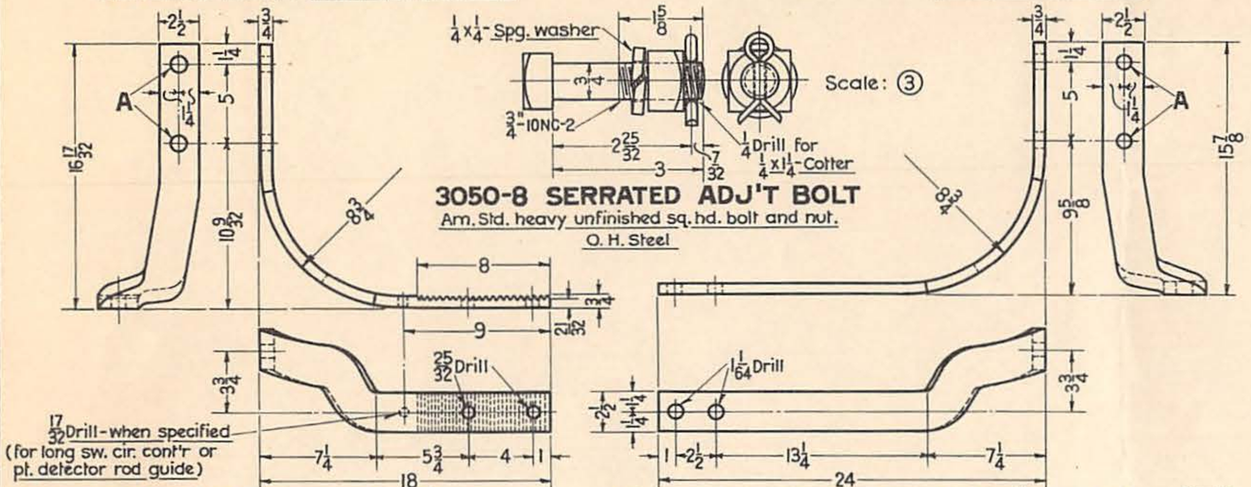

Scale: ③
¼x¼-Spg. washer
2
¾"-10NC-2
B
C
13/32
¼ Drill for
¼x1¼ Cotter

ORD. NO.	O. H. Steel	B	C	USAGE
3050-11	POINT BOLT	3 27/32	4¼	105 lb. rail-with sw. cir. cont'r pt. lug.
3050-12	" "	3 3/32	3½	105 lb. rail-without sw. cir. con. pt. lug.

Am. Std. heavy unfinished sq. hd. bolts with hex. nuts.


½
2⅜
1¼R.
1
2½
¾
¾
2½
1
1 9/16 Drill
25/32 Drill
Scale: ②
1¼
2½
9½

3050-7
ADJUSTMENT BRACKET
Forged Steel


2½
¾
A
1¼
5
16 17/32
10 9/32
8¾
8
¾
21/32
9
3¾
25/32 Drill
¼x¼-Spg. washer
5/8
¾
¾"-10NC-2
2 25/32
3
7/32
¼ Drill for
¼x1¼-Cotter
Scale: ③
1 1/64 Drill
2½
1¼
15⅞
9⅝
8¾
3¾

3050-8 SERRATED ADJ'T BOLT
Am. Std. heavy unfinished sq. hd. bolt and nut.
O. H. Steel

17/32 Drill-when specified
(for long sw. cir. cont'r or pt. detector rod guide)

7¼ — 5¾ — 4 — 1 — 18

1 — 2½ — 13¼ — 7¼ — 24

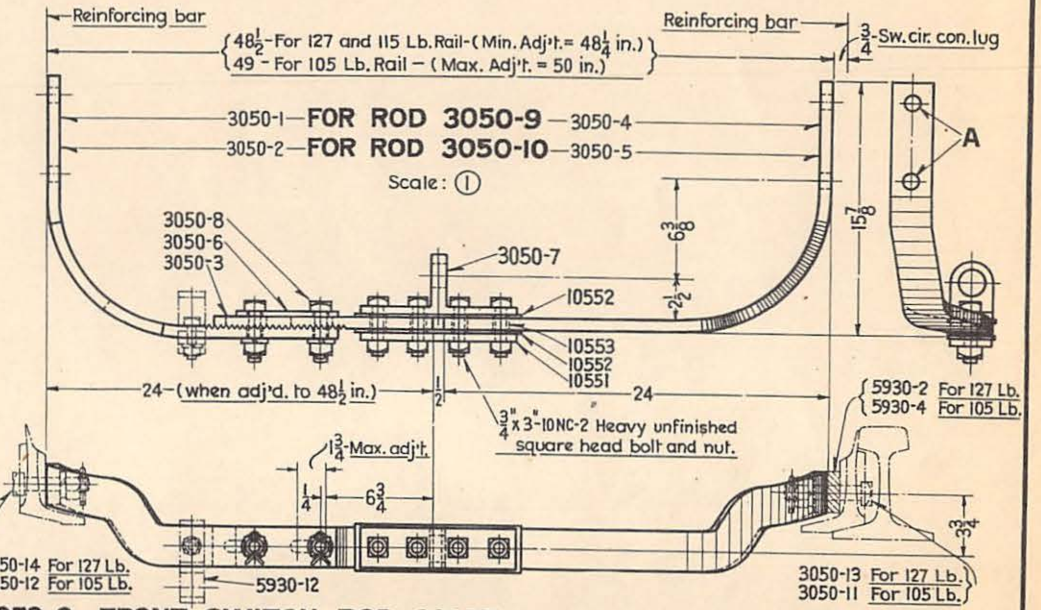
3050-1 LEFT LUG END — **A** = 15/16 For 127 Lb. Rail.
3050-2 " " " — **A** = 13/16 For 105 Lb. Rail.

SERRATED
Forged Steel

3050-4 RIGHT LUG END — **A** = 15/16 For 127 Lb. Rail.
3050-5 " " " — **A** = 13/16 For 105 Lb. Rail.

Forged Steel

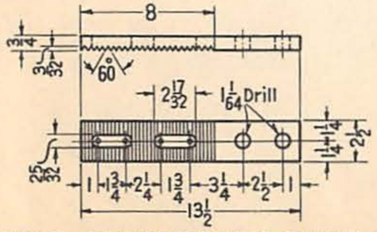
Scale: ①


Reinforcing bar
{48½-For 127 and 115 Lb. Rail-(Min. Adj't. = 48¼ in.)
49 - For 105 Lb. Rail - (Max. Adj't. = 50 in.)}
Reinforcing bar
¾-Sw. cir. con. lug
3050-1—FOR ROD 3050-9—3050-4
3050-2—FOR ROD 3050-10—3050-5
Scale: ①
A
15⅞
6⅜
3050-8
3050-6
3050-3
3050-7
10552
2½
10553
10552
10551
24-(when adj'd. to 48½ in.)
½
24
{5930-2 For 127 Lb.
5930-4 For 105 Lb.
¾"x3"-10NC-2 Heavy unfinished square head bolt and nut.
1¾ Max. adj't.
¼
6¾
3¾
{3050-14 For 127 Lb.
3050-12 For 105 Lb.
5930-12
3050-13 For 127 Lb.
3050-11 For 105 Lb.}

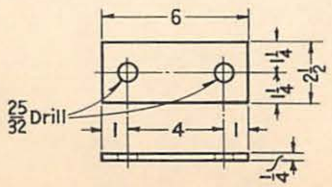
3050-9 FRONT SWITCH ROD COMPL. — WITH LUGS 3050-1 AND 3050-4 FOR 127 LB. RAIL
3050-10 " " " " — WITH LUGS 3050-2 AND 3050-5 FOR 105 LB. RAIL

References shown for long sw. cir. cont'r. rod guide 5930-12, point lugs 5930-2, 5930-4 and point bolts 3050-11, 3050-12, 3050-13 and 3050-14 to be furnished only when so specified.

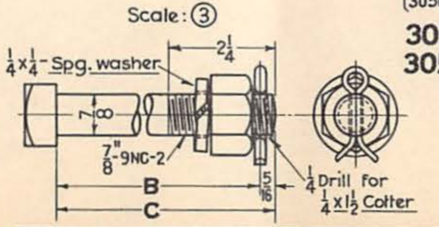
FOR POWER AND MECHANICAL INTERLOCKED SWITCH LAYOUTS 3000 AND 5900


8
¾
3/32
60°
2 17/32
1 1/64 Drill
1¼
2½
25/32
1
1¾
2¼
1¾
3¼
2½
1
13½

3050-3 INTERMEDIATE SECTION
SERRATED
O. H. Steel


6
25/32 Drill
1
4
1
1¼
2½
¼

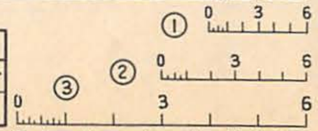
3050-6 STRAP WASHER
O. H. Steel
Scale: ②


Scale: ③
¼x¼-Spg. washer
2¼
7/8
⅞"-9NC-2
B
C
5/16
¼ Drill for
¼x1½ Cotter

ORD NO.	O. H. Steel	B	C	USAGE
3050-13	POINT BOLT	4 3/16	4½	127 lb. rail-with sw. cir. cont'r pt. lug.
3050-14	" "	3 7/16	3¾	127 lb. rail-without sw. cir. con. pt. lug.

Am. Std. heavy unfinished sq. hd. bolts with hex. nuts.

NOTE: When ordering parts give reference number and name shown in large type.


①
0
3
6
②
0
3
6
③
0
3
6

Scales: Dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FRONT SWITCH RODS
INTERLOCKED SINGLE SWITCHES
127 LB. AND 105 LB. RAIL

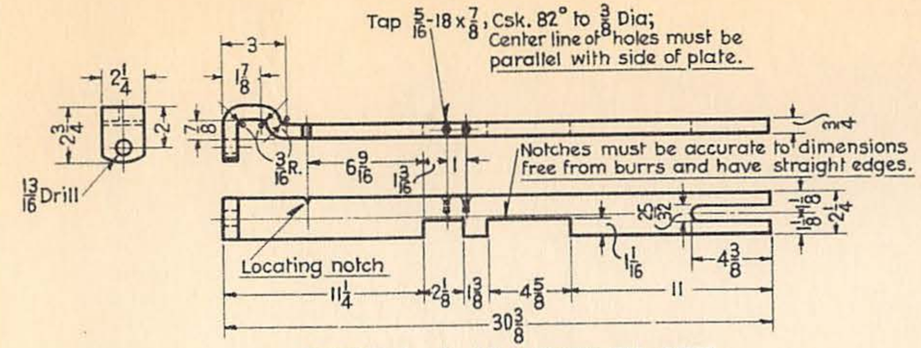
N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

3050

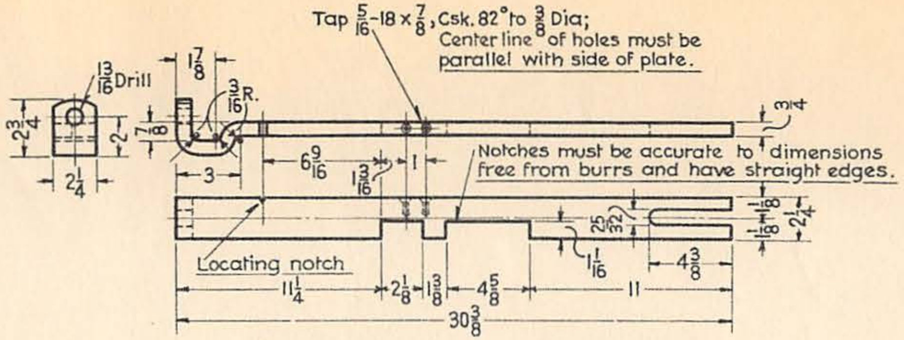
ISSUE	DATE
1	10-6-1936

Approved by Representatives of Lines shown.
J C Mock
Chairman

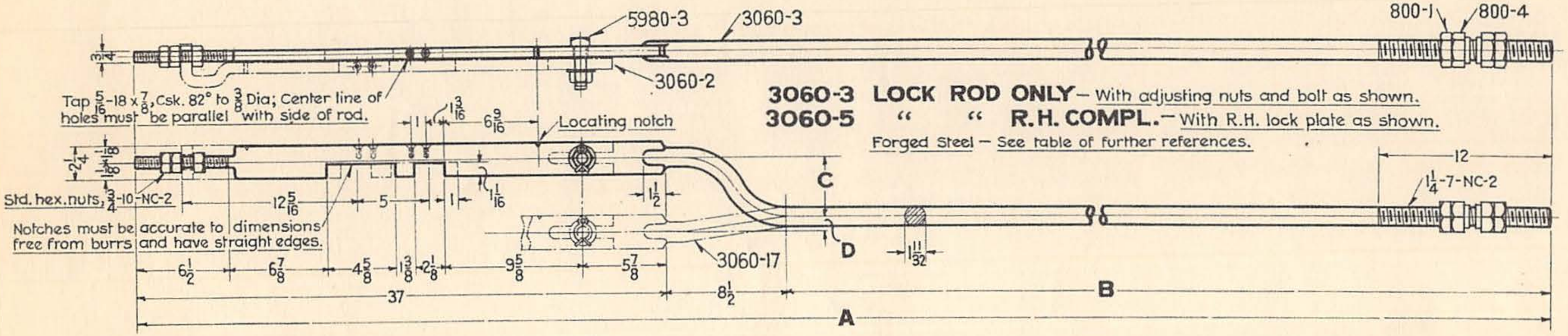
WAH


Tap 5/16-18 x 7/8, Csk. 82° to 3/8 Dia; Center line of holes must be parallel with side of plate.
3
1 7/8
2 1/4
2 3/4
2
7/8
3/16 R.
13/16 Drill
6 9/16
1 3/16
1
3/4
Notches must be accurate to dimensions free from burrs and have straight edges.
Locating notch
25/32
1 1/16
1 1/8
2 1/4
4 3/8
11 1/4
2 1/8
1 3/8
4 5/8
11
30 3/8

3060-1 L. H. LOCK PLATE
Forged steel


Tap 5/16-18 x 7/8, Csk. 82° to 3/8 Dia; Center line of holes must be parallel with side of plate.
13/16 Drill
1 7/8
3/16 R.
2 3/4
2
7/8
2 1/4
3
6 9/16
1 3/16
1
3/4
Notches must be accurate to dimensions free from burrs and have straight edges.
Locating notch
25/32
1 1/16
4 3/8
1 1/8
2 1/4
11 1/4
2 1/8
1 3/8
4 5/8
11
30 3/8

3060-2 R. H. LOCK PLATE
Forged steel


5980-3
3060-3
800-1
800-4
3/4
3060-2
Tap 5/16-18 x 7/8, Csk. 82° to 3/8 Dia; Center line of holes must be parallel with side of rod.
1
1 3/16
6 9/16
Locating notch
2 1/4
1/8
1/8
Std. hex. nuts, 3/4-10-NC-2
12 5/16
5
1
1 1/16
1 1/2
C
D
12
1 1/4-7-NC-2
Notches must be accurate to dimensions free from burrs and have straight edges.
3060-17
1 11/32
6 1/2
6 7/8
4 5/8
1 3/8
2 1/8
9 5/8
5 7/8
37
8 1/2
B
A

3060-3 LOCK ROD ONLY – With adjusting nuts and bolt as shown.
3060-5 " " R.H. COMPL. – With R.H. lock plate as shown.
Forged Steel – See table of further references.

LOCK ROD ONLY WITH ADJUSTING NUTS AND BOLT (WITHOUT LOCK PLATE)				LOCK ROD COMPL. L.H. WITH LOCK PLATE 3060-1	LOCK ROD COMPL. R.H. WITH LOCK PLATE 3060-2	USAGE		
						WEIGHT OF RAIL	G. R. S. MODEL 5A MACHINE	
ORD. NO.	A	B	C	ORDER NO.	ORDER NO.		DIST. FROM GAUGE	MOUNTING
3060-3	8'-2½"	4'-5"	4⅛"	**3060-4**	**3060-5**	127	47"	Tie unframed; With saddle plate.
3060-6	8'-2½"	4'-5"	3⅜"	**3060-7**	**3060-8**	127	47"	Tie unframed; Without saddle plate.
3060-9	8'-2½"	4'-5"	4 5/16"	**3060-10**	**3060-11**	105	47"	Tie unframed; With saddle plate.
3060-12	8'-2½"	4'-5"	3 9/16"	**3060-13**	**3060-14**	105	47"	Tie unframed; Without saddle plate.
3060-15	7'-3½"	3'-6"	D = 11/16"	**3060-16**	**3060-17**	105	36"	Tie framed 5 ins; With saddle plate.
3060-18	7'-3½"	3'-6"	D = ⅛"	**3060-19**	**3060-20**	127	36"	Tie framed 4 ins; With saddle plate.

0 3 6 9 12
Scale: and dimensions given in inches

NOTE: Lock plate shown for 5 in. throw and may be adjusted from 3½ to 6 in. throw.

When ordering parts give number and name shown in large type or in the table.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

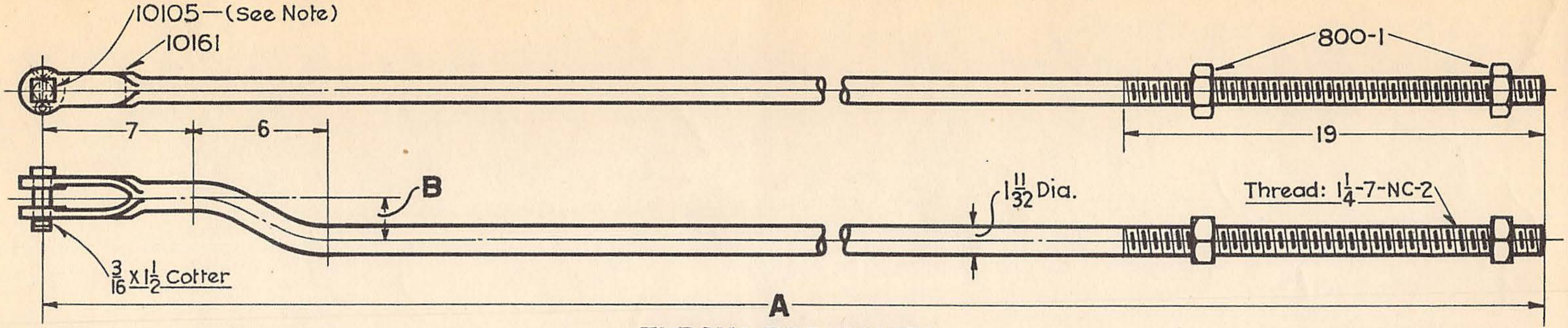
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

3060

ISSUE	DATE
1	4-21-1936

LOCK RODS
G.R.S. MOD. 5A SWITCH MACHINE

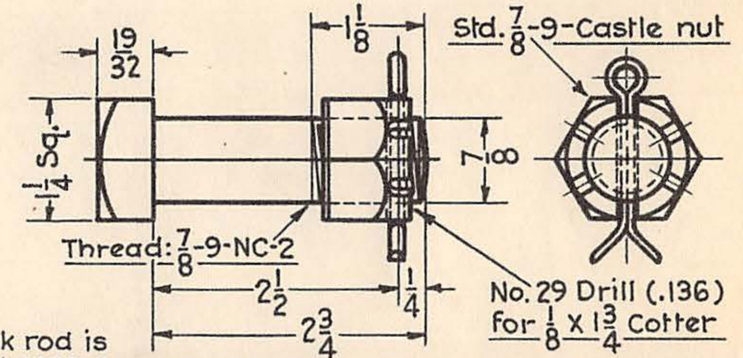
Approved by Representatives of Lines shown.
JAMock
Chairman


10105—(See Note)
10161
800-1
7
6
19
B
$1\frac{11}{32}$ Dia.
Thread: $1\frac{1}{4}$-7-NC-2
$\frac{3}{16} \times 1\frac{1}{2}$ Cotter
A

THROW ROD COMPL.

Forged steel – See Table of Order Numbers

Scale: 2 In. = 1 Ft.


$\frac{19}{32}$
$1\frac{1}{8}$
Std. $\frac{7}{8}$-9-Castle nut
$1\frac{1}{4}$ Sq.
$\frac{7}{8}$
Thread: $\frac{7}{8}$-9-NC-2
$2\frac{1}{2}$
$\frac{1}{4}$
$2\frac{3}{4}$
No. 29 Drill (.136) for $\frac{1}{8} \times 1\frac{3}{4}$ Cotter

3070-9 JAW BOLT COMPL.

Turned – C. R. Steel

Scale: 6 In. = 1 Ft.

THROW ROD ONLY WITHOUT JAM NUTS OR JAW PIN			THROW ROD COMPL WITH JAM NUTS AND JAW PIN		USAGE G.R.S. MOD. 5A-SWITCH MACHINE	
ORDER NO.	A	B	ORDER NO.	SWITCH-WT. OF RAIL	DISTANCE FROM GAUGE	INSTALLATION
3070-1	5'-8"	$1\frac{3}{4}$"	3070-2	105 – 127	47"	Tie unframed – without saddle plate
3070-3	5'-8"	$2\frac{1}{2}$"	3070-4	105 – 127	47"	Tie unframed – with saddle plate
3070-5	4'-9"	$1\frac{1}{2}$"	3070-6	127	36"	Tie framed 4 ins. with saddle plate
3070-7	4'-9"	$2\frac{1}{2}$"	3070-8	105	36"	Tie framed 5 ins. with saddle plate

NOTE: When lock rod is not used, use bolt 3070-9 for throw rod in lieu of pin 10105.

When ordering parts give number and name shown in large type.

Scales: as shown.
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

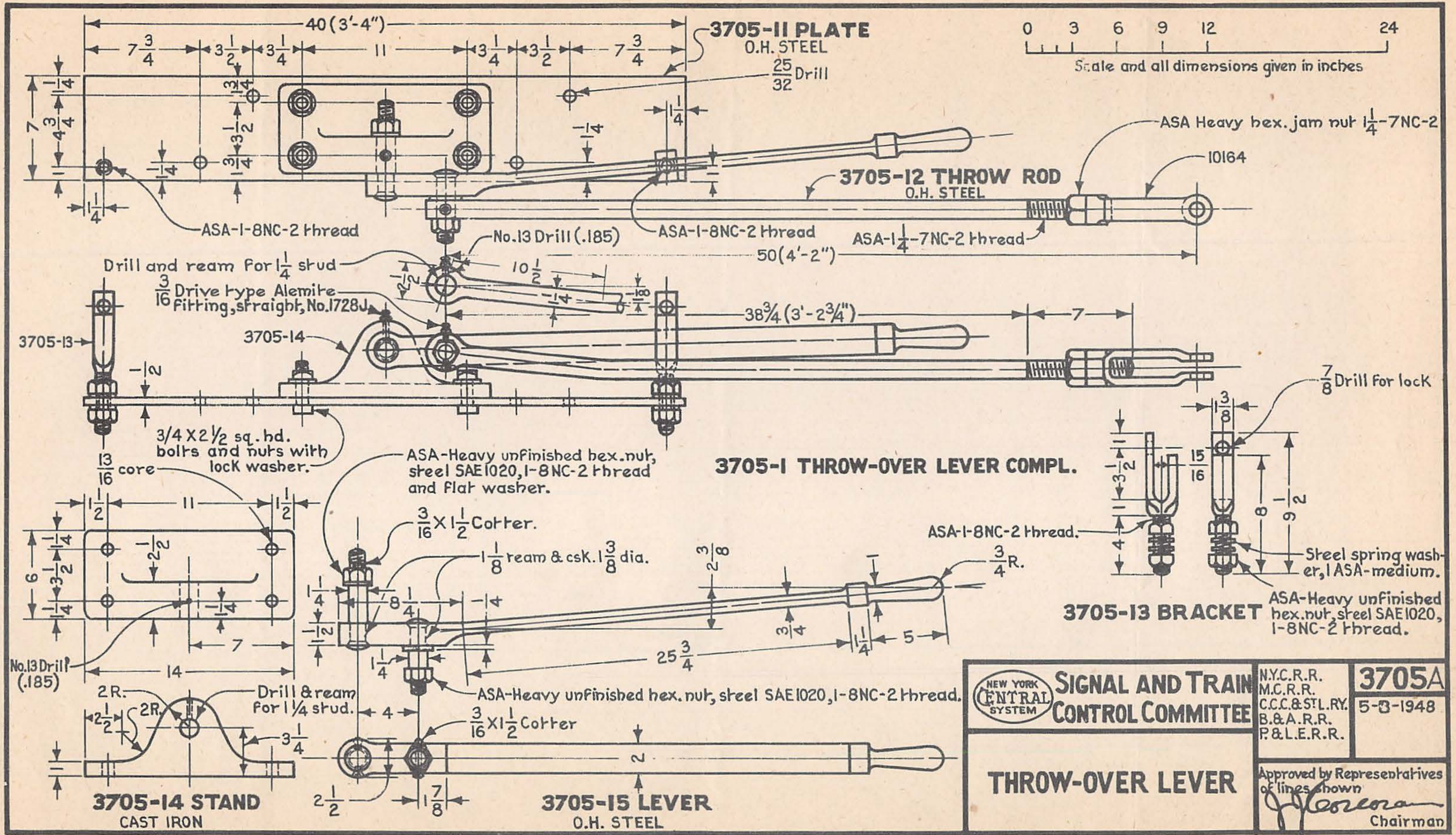
N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

3070	
ISSUE	DATE
1	2-27-1936

THROW RODS
G.R.S. MOD. 5A-MACHINE

Approved by Representatives of Lines shown.

Chairman


3705-11 PLATE
O.H. STEEL
40 (3'-4")
$7\frac{3}{4}$
$3\frac{1}{2}$
$3\frac{1}{4}$
11
$3\frac{1}{4}$
$3\frac{1}{2}$
$7\frac{3}{4}$
$\frac{25}{32}$ Drill
$1\frac{1}{4}$
7
$4\frac{3}{4}$
$\frac{3}{4}$
$3\frac{1}{2}$
$\frac{1}{4}$
ASA-1-8NC-2 thread
0 3 6 9 12 24
Scale and all dimensions given in inches
ASA Heavy hex. jam nut $1\frac{1}{4}$-7NC-2
10164
3705-12 THROW ROD
O.H. STEEL
ASA-1-8NC-2 thread
ASA-$1\frac{1}{4}$-7NC-2 thread
No.13 Drill (.185)
50 (4'-2")
Drill and ream for $1\frac{1}{4}$ stud
$10\frac{1}{2}$
$\frac{3}{16}$ Drive type Alemite fitting, straight, No.1728J.
$38\frac{3}{4}$ (3'-$2\frac{3}{4}$")
7
3705-13
3705-14
$\frac{1}{2}$
$\frac{1}{8}$
$\frac{7}{8}$ Drill for lock
$1\frac{3}{8}$
3/4 X $2\frac{1}{2}$ sq. hd. bolts and nuts with lock washer.
$\frac{13}{16}$ core
ASA-Heavy unfinished hex. nut, steel SAE1020, 1-8NC-2 thread and flat washer.
3705-1 THROW-OVER LEVER COMPL.
$3\frac{1}{2}$
$\frac{15}{16}$
8
$9\frac{1}{2}$
$1\frac{1}{2}$
11
$1\frac{1}{2}$
$2\frac{1}{2}$
6
$\frac{3}{16}$ X $1\frac{1}{2}$ Cotter.
$1\frac{1}{8}$ ream & csk. $1\frac{3}{8}$ dia.
$2\frac{3}{8}$
ASA-1-8NC-2 thread.
4
Steel spring washer, 1 ASA-medium.
$\frac{3}{4}$ R.
$8\frac{1}{4}$
$\frac{3}{4}$
5
$25\frac{3}{4}$
ASA-Heavy unfinished hex. nut, steel SAE1020, 1-8NC-2 thread.
3705-13 BRACKET
No.13 Drill (.185)
14
2R.
2R.
$2\frac{1}{2}$
Drill & ream for $1\frac{1}{4}$ stud.
$3\frac{1}{4}$
ASA-Heavy unfinished hex. nut, steel SAE1020, 1-8NC-2 thread.
$\frac{3}{16}$ X $1\frac{1}{2}$ Cotter
2
$2\frac{1}{2}$
$1\frac{7}{8}$
3705-14 STAND
CAST IRON
3705-15 LEVER
O.H. STEEL

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& St.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3705A

5-8-1948

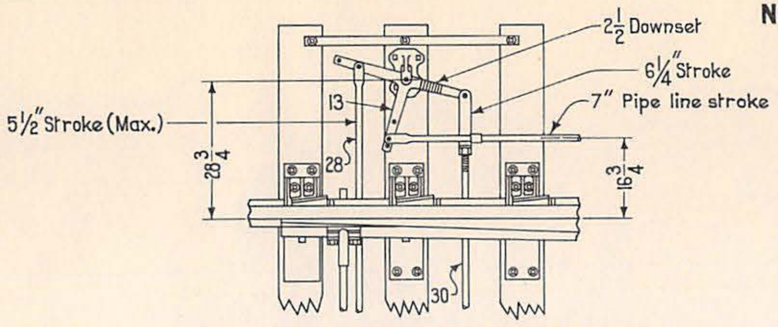
THROW-OVER LEVER

Approved by Representatives of lines shown

J. J. Corcoran
Chairman

(Printed in U.S.A.)

RECEIVED
OCT 25 1948
SPECIFICATION DEPT.

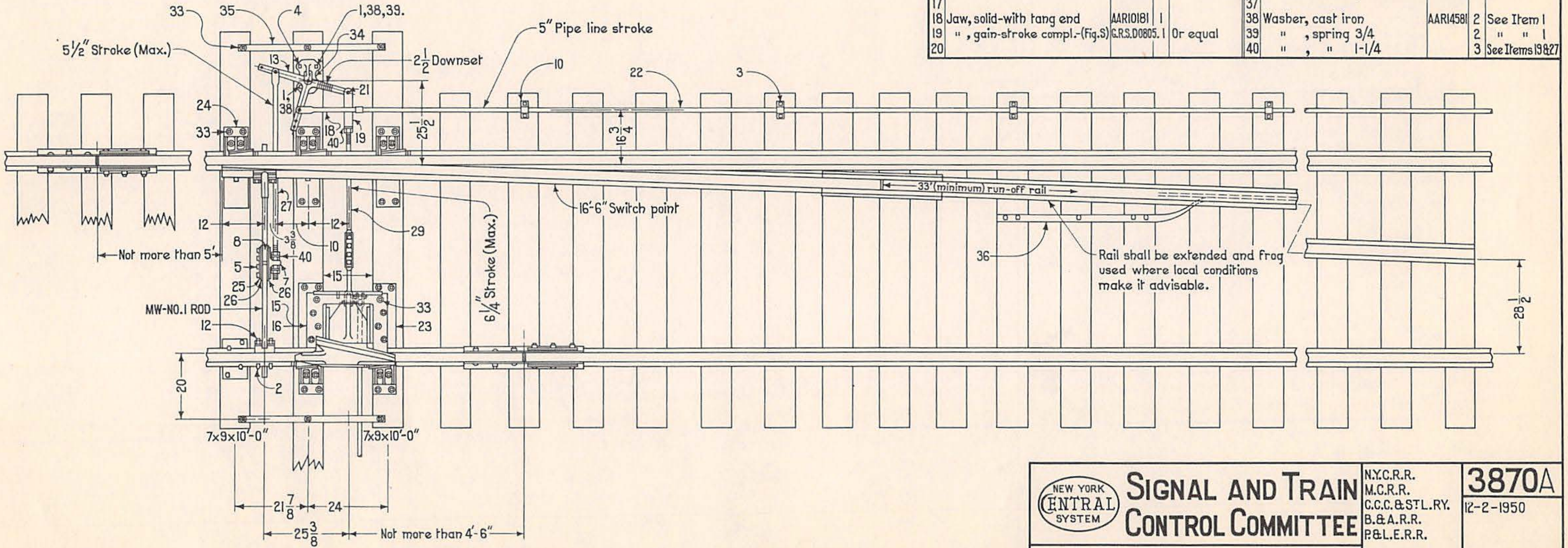

2½ Downset
6¼" Stroke
7" Pipe line stroke
5½" Stroke (Max.)
13
28
28¾
16¾
30

CRANK ARRANGEMENT WHERE PIPE LINE STROKE APPROXIMATES 7 INCHES

NOTES:

1. To be installed only as required by plan 81.

ITEM	DESCRIPTION	REF.	REQ.	USE
1	Bolt ¾x10 reg.sq.hd. and nut	Whr.reqd.	2	
2	" ,Hook 3881-7, 3881-8 or 3881-9		2	At Guide Clip
3	" ,lag ½x3ASA-cut thread			
4	" , " ¾x7 " - " "		2	
5	" ,compl.	3001-19	4	
6				
7	Bracket	3001-14	1	
8	Bushing, Insulation	AAR10557	4	
9				
10	Carrier, pipe-one way	AAR10749		
11				
12	Clip, guide	3881-12	1	
13	Crank, three arm	3907-18	1	
14				
15	Derail, Hayes Mod. HBP size 6.	For 105 lb. rail.	1	Specify R. or L.H.
16	" , " " " " 7.	" 127 lb. "	1	" " " " "
17				
18	Jaw, solid-with tang end	AAR10181	1	
19	" , gain-stroke compl.-(Fig.S)	G.R.S.D0805.	1	Or equal
20				
21	Pin, jaw	AAR10105	4	
22	Pipe, signal with plug & couplg.	AAR10155		
23	Plate, derail tie-compl. 3894-1 or 3894-2		2	At derail
24	" ,switch	EC H23A, Slv	3	
25	" ,splice-insulation	AAR10551	1	
26	" ,Insulation	AAR10552	2	
27	Rod compl., throw	3002-6	1	At switch point
28	" " ., "	3002-10	1	" " "
29	" " .,derail connecting	3896-6	1	No derail tie plate
30	" " ., " "	3896-7	1	" " " "
31	" " ., " "	3896-20	1	With " " "
32	" " ., " "	3896-21	1	" " " "
33	Spike, screw	EC-G32	40	
34	Stand, crank-with center pin	AAR10082	1	
35	Strap, tie-short	3909-12	2	
36	" ,Anti-Creeper, MW No.1	EC-H47A	1	
37				
38	Washer, cast iron	AAR14581	2	See Item 1
39	" , spring 3/4		2	" " 1
40	" , " 1-1/4		3	See Items 19 & 27


33
35
4
1,38,39.
34
5½" Stroke (Max.)
13
2½ Downset
1
38
21
24
33
18
40
19
25½
5" Pipe line stroke
10
22
3
16¾
27
12
12
29
8
3⅜
10
40
5
25
7
26
26
15
15
16
12
MW-NO.1 ROD
33
23
2
20
Not more than 5'
6¼" Stroke (Max.)
16'-6" Switch point
33' (minimum) run-off rail
36
Rail shall be extended and frog used where local conditions make it advisable.
28½
7x9x10'-0"
7x9x10'-0"
21⅞
24
25⅜
Not more than 4'-6"

0 12 24 36 inches

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3870A

12-2-1950

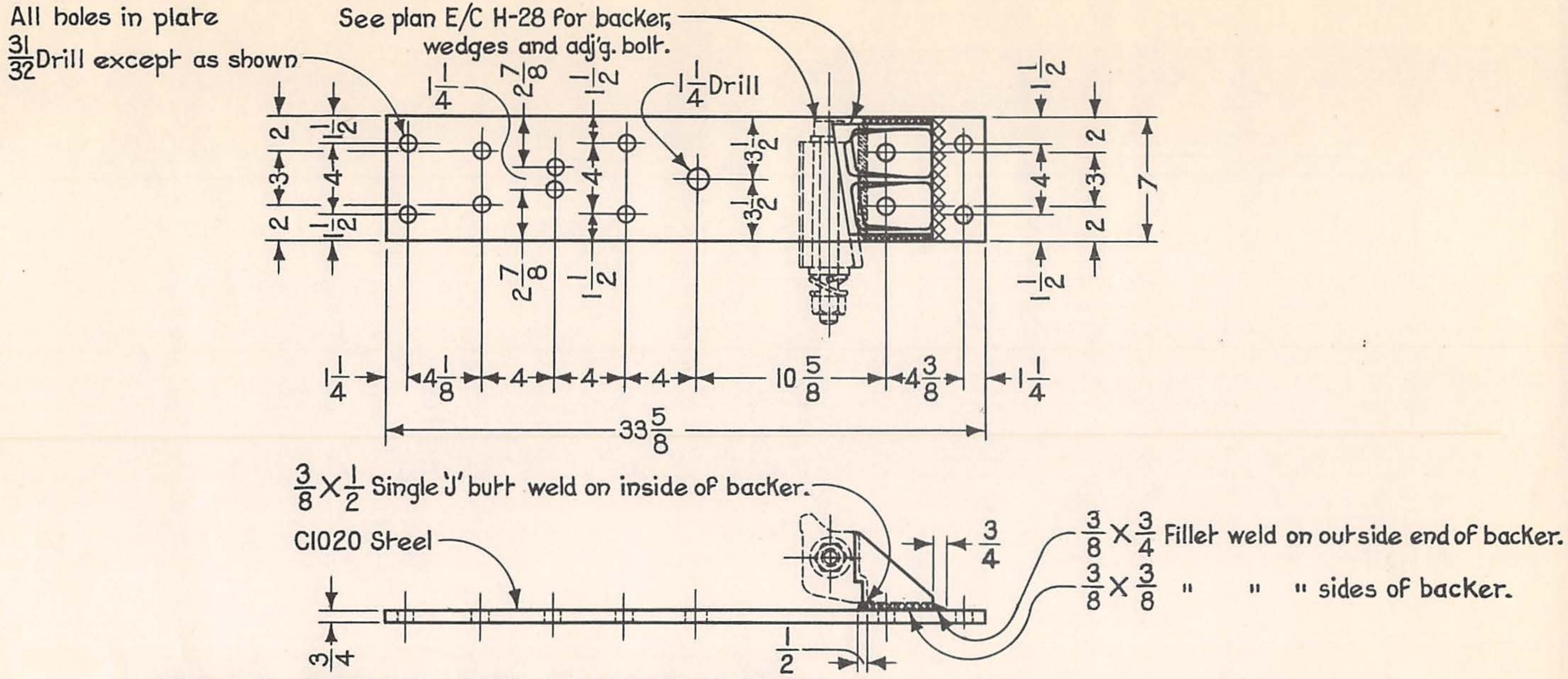
DERAIL LAYOUT

30 INCH BLOCK AND SWITCH-POINT TYPE

Approved by Representatives of lines shown.

Chairman.

Printed in U.S.A.


All holes in plate
31/32 Drill except as shown
See plan E/C H-28 for backer, wedges and adj'g. bolt.
1 1/4 Drill
1 1/4
2 7/8
1 1/2
2
3
2
1 1/2
4
3 1/2
7
1 1/4
4 1/8
4
4
4
10 5/8
4 3/8
1 1/4
33 5/8
3/8 X 1/2 Single 'J' butt weld on inside of backer.
C1020 Steel
3/4
3/4
1/2
3/8 X 3/4 Fillet weld on outside end of backer.
3/8 X 3/8 " " " sides of backer.

3894-1 DERAIL TIE PLATE COMPL. With backer, wedge and adj'g. bolt for 127 lb. rail.
3894-2 ,, ,, ,, ,, " " , " " " . " " 105 lb. " .

For Layout 3870

All dimensions given in inches. Scale: 1½ in.=1 ft.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.Ry.
B.&A.R.R.
P.&L.E.R.R.

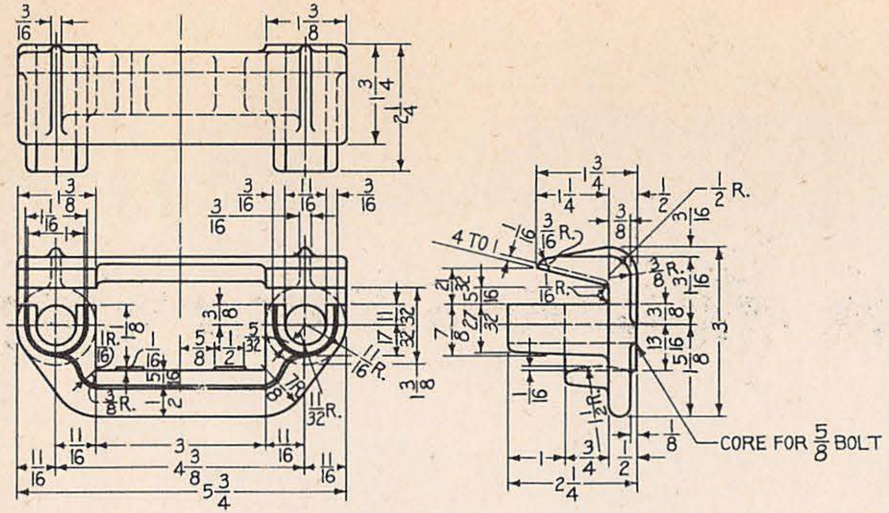
3894A
7-25-1949

TIE PLATE
FOR BLOCK TYPE DERAIL

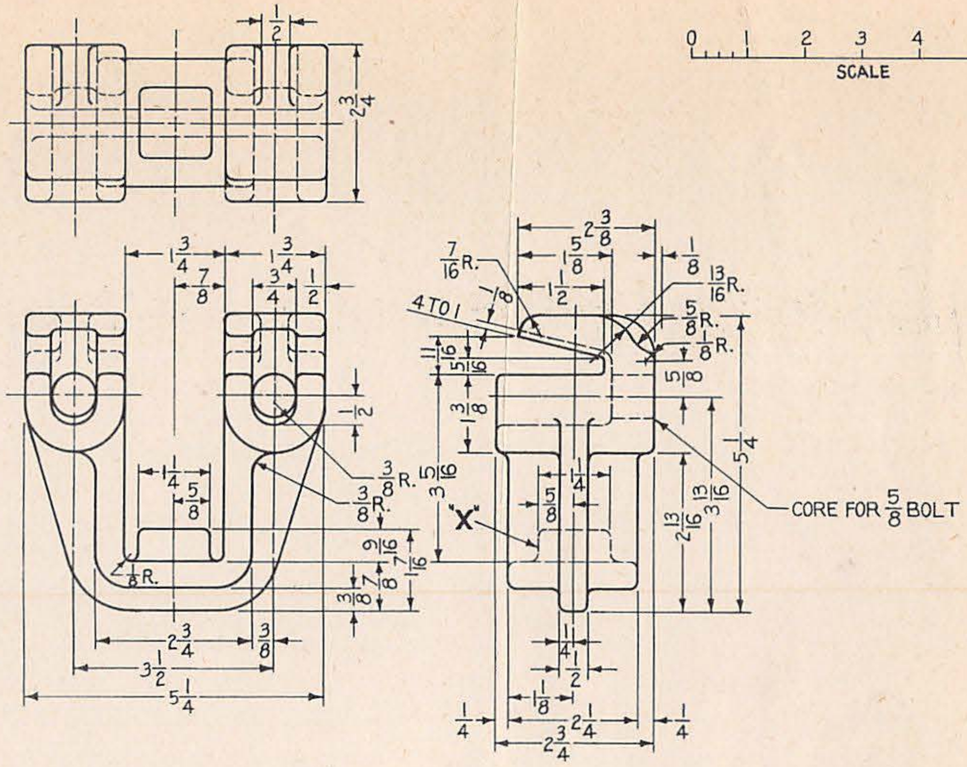
Approved by Representatives of lines shown.
Chairman.

Printed in U.S.A.

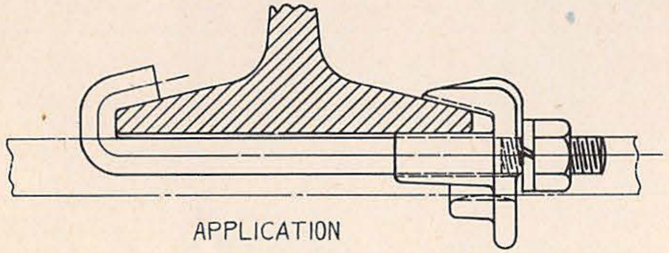
0 1 2 3 4 5 6 (INCHES)
SCALE


4 TO 1
CORE FOR 5/8 BOLT

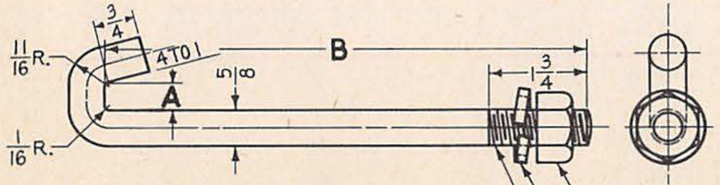
3881-11 GUIDE CLIP FOR HORIZONTAL FRONT AND NO. 1 RODS OF SPLIT POINT DERAIL
MALLEABLE IRON OR STEEL


4 TO 1
"X"
CORE FOR 5/8 BOLT

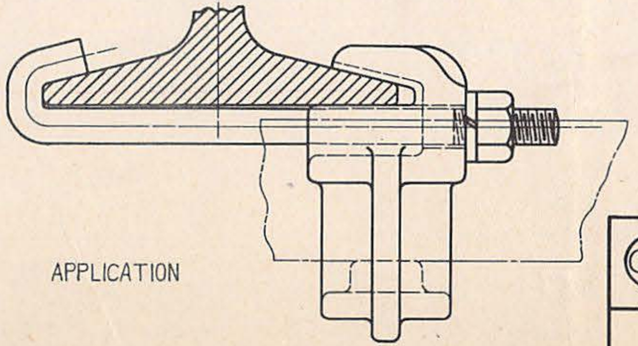
3881-12 GUIDE CLIP (WITH "X") FOR VERTICAL NO. 1 ROD OF SPLIT POINT DERAIL AND FRONT ROD OF DOUBLE SLIP
3881-13 " " (WITHOUT "X") FOR VERTICAL FRONT ROD OF SPLIT POINT DERAIL
MALLEABLE IRON OR STEEL



APPLICATION


11/16 R.
1/16 R.
3/4
4 TO 1
B
A
5/8
1 3/4
5/8-11, N.C. 2 THD., A.S.A.-HEAVY UNFINISHED HEX. NUT S.A.E. 1020 STEEL
STEEL SPG. WASHER
5/8 A.S.A.-MEDIUM
5/8-11 N.C.-2

HOOK BOLT
O.H. STEEL



APPLICATION

NOTES:
ALL DIMENSIONS GIVEN IN INCHES

WHEN ORDERING PARTS GIVE NUMBER AND NAME SHOWN IN LARGE TYPE OR IN THE TABLE

PROTECTIVE TREATMENT TO BE IN ACCORDANCE WITH INSTRUCTION 350

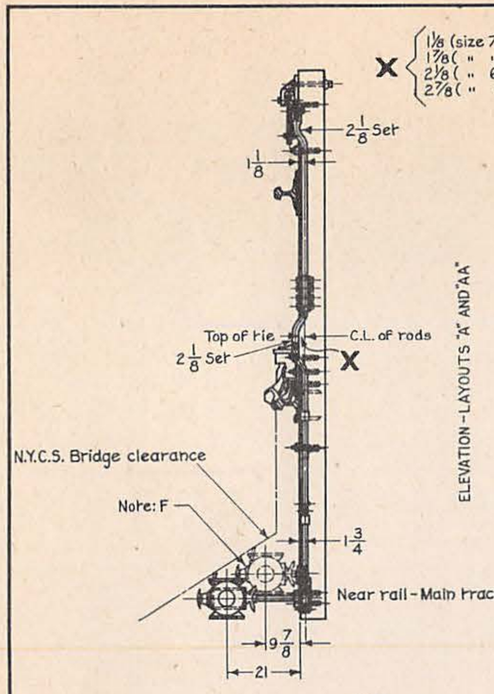
ORDER NO.	HOOK BOLTS COMPL. WITH HEX. NUT & SPG. WASHER	A	B
3881-7	FOR 105LB. DUDLEY RAIL AND 100LB. A.S.C.E. RAIL	11/32	7 1/2
3881-8	" 112 & 115LB. DUDLEY RAIL AND 100LB. A.S.C.E. RAIL	7/16	7 1/2
3881-9	" 127 & 131LB. " & R.E. RAIL, & 100LB. A.S.C.E. RAIL	7/16	9

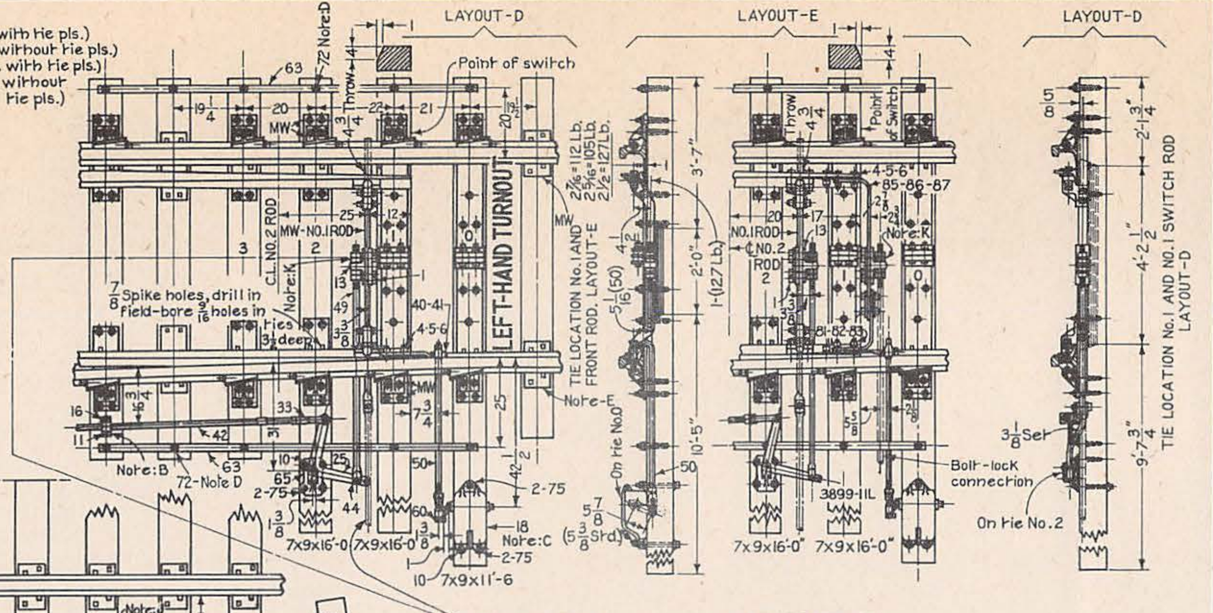
(Printed in U.S.A.)

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.R.R.
3881A
6-12-1947

GUIDE CLIPS

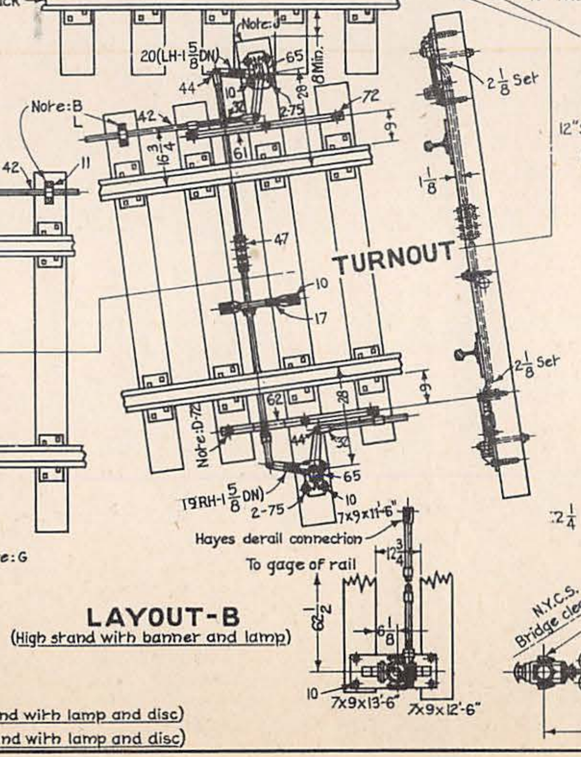
Approved by Representatives of lines shown.
Chairman


X
1⅛ (size 7 derail-127 lb. with tie pls.)
1⅞ (" " " without tie pls.)
2⅛ (" 6 " -105 lb. with tie pls.)
2⅞ (" " " " without tie pls.)
2⅛ Set
1⅛
Top of tie
C.L. of rods
2⅛ Set
N.Y.C.S. Bridge clearance
Note: F
1¾
Near rail - Main track
9⅞
21
ELEVATION - LAYOUTS "A" AND "AA"

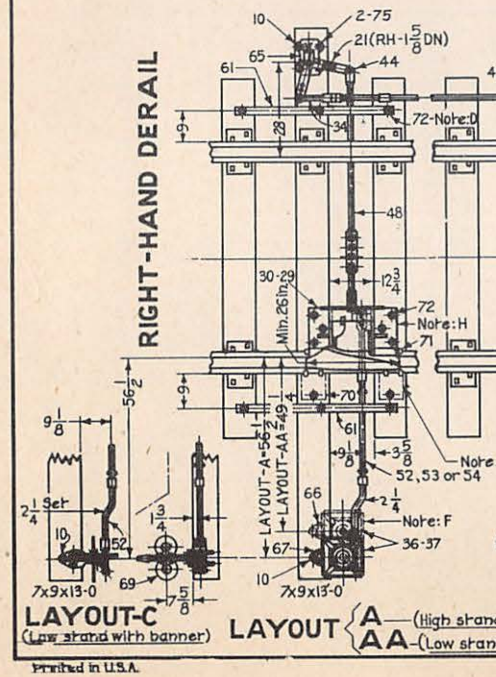

LAYOUT-D
LAYOUT-E
LAYOUT-D
72 Note: D
63
Throw 4¼
Point of switch
19¼
20
22
21
MW
20 1/2
2⅞=112 Lb.
2 9/16=105 Lb.
2½=127 Lb.
LEFT-HAND TURNOUT
MW
C.L. NO. 2 ROD
MW-NO. 1 ROD
Note: K
25
3
2
13
49
⅞ Spike holes, drill in field-bore 9/16 holes in ties 3½ deep
40-41
4-5-6
33
16
42
11
Note: B
63
72-Note D
65
2-75
44
60
18
Note: C
2-75
10
7x9x16'-0
7x9x16'-0
7x9x11'-6
MW-Switch stand connection
TIE LOCATION No. 1 AND FRONT ROD. LAYOUT-E
Note-E
On tie No. 0
3'-7"
2'-0"
1-(127 Lb.)
5 1/16 (50)
10'-5"
4-5-6"
85-86-87
20
17
13
NO. 1 ROD
C NO. 2 ROD
Note: K
81-82-83
Throw 4¾
Point of Switch
3899-1IL
5⅞ (5⅜ Std.)
7x9x16'-0"
7x9x16'-0"
Bolt-lock connection
On tie No. 2
3⅛ Set
2'-1¾"
4'-2½"
9'-3"
9'-7¼
TIE LOCATION No. 1 AND No. 1 SWITCH ROD LAYOUT-D

LAYOUT-E
WITH FRONT ROD
17" SPACING FOR No. 1 ROD

Scale & All Demension in inches

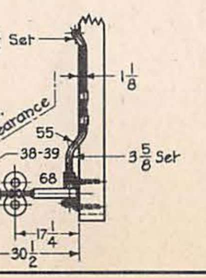

Note: J
20 (LH-1⅝ DN)
44
65
2⅛ Set
8 Min.
2-75
72
Note: B
42
L
16¾
61
47
TURNOUT
10
17
1⅛
2⅛ Set
62
28
Note: D-72
44
32
19 (RH-1⅝ DN)
2-75
65
7x9x11'-6"
Hayes derail connection
To gage of rail
12¾
6½
6⅞
7x9x13'-6"
7x9x12'-6"

LAYOUT-B
(High stand with banner and lamp)


RIGHT-HAND DERAIL
10
2-75
21 (RH-1⅝ DN)
61
65
44
29
34
72-Note: D
42
11
48
30-29
12¾
Min. 26 in.
72
Note: H
71
56½
70
61
9⅝
3⅝
52, 53 or 54
Note: G
LAYOUT-A=56½
LAYOUT-AA=49
66
2¼
Note: F
36-37
67
10
7x9x13'-0
9⅛
2¼ Set
10
52
1¾
69
7⅝
7x9x13-0

LAYOUT-C
(Low stand with banner)

LAYOUT {A — (High stand with lamp and disc) AA — (Low stand with lamp and disc)


2¼ Set
N.Y.C.S. Bridge clearance
55
38-39
68
1⅛
3⅝ Set
17¼
30½

LAYOUT-D
WITHOUT FRONT ROD
12" SPACING FOR No. 1 ROD

NOTES: A-Location of derails shall be in accordance with Plan 81.

B-Pipe carrier spacing and distance between first carrier and center line of crank stand must not exceed 60 inches.

C-Switch circuit controller shall be operated from the normal closed point.

D-Holes for screw spikes shall be bored 15/16 in. diam., 1½ in. below shoulder of screw spike, following with 11/16 in. diam. hole.

E-Double shoulder tie plates shall be provided on 5 ties, starting with the second tie ahead of switch points.

F-Low stand 13995 in Layout "AA" to be used only where high stand 13997 in Layout "A", or banner in Layout "C" cannot be used.

G-Rail shims when required, refer to Plan 3898.

H-Tie plates may be provided under derail as directed by the Signal Engineer.

J-Cross connection tie shall be located to provide, as near as practicable, proper pipe line compensation and minimum clearance of 8 in. between end of tie and base of main rail.

K-Use of spring washers for throw rod and lock rod adjustments optional.

L-✱Estimated in material table.

ITEM	DESCRIPTION	REF. NO.	REQ.	USE
1	Bolt, Compl. ¾x3 Reg. sq. hd. (1" Thd.)	3001-18	4	For item 13
2	" ¾x10-reg. sq. hd. and nut	(spg. whr. req)	10	CK. std.-Sw. cir. con'r.
4	Bolt, Sw. Point ¾ x 3½ (105-115)	3001 Item Y	2	Closed point side of Layout D and Open Point Side of Layout E
5	" , " " ⅞ x4 (112-127 lb.)	3001 " W	2	
6	" , " " 1x4 (112-127-131 lb.)	3001 " U	2	
10	Bolt, Lag ¾x7 ASA-cut thd.		15	All items except 16-31
11	" , " ½x3 " " "		60	✱Items 16-31-Note: L
13	Bracket-For front and No. 1 rods	3001-14	1	For item 49
16	Carrier, pipe-One way	AAR 10749	30	✱ Note: L
17	" , " -Transverse	Raco-411-1	1	Or equal
18	Controller, sw. cir., 5⅞ arm 1" offset	(new-5⅞)	1	
19	Crank, for left-hand turnout	3907-11(RH)	1	Center crosslead
20	" , " " " "	3907-12(LH)	1	" "
21	" , " " " "	3907-15(RH)	1	Derail end
22	" , for right-hand turnout	3907-12(LH)	1	Center crosslead
23	" , " " " "	3907-11(RH)	1	" "
24	" , " " " "	3907-16(LH)	1	Derail end
25	" , for right or left hand turnt	3907-14	1	
26	Cotter 3/16 x 1½	Com'l.	10	Jaw pins
29	Derail, Hayes Mod. HP size 7. (item 70)	For 127# Rail	1	Specify R. or L.H.
30	Derail, Hayes Mod. HP size 6 (item 70)	For 105# Rail	1	Specify R. or L.H.
31	Guide-When req'd	3006-25	1	Item 51
32	Jaw, solid with tang end	AAR 10181	2	Pipe line
33	" , screw " " "	AAR 10199	1	" "
34	" , gain-stroke compl.-(Fig. 5)	GRS-D0805	1	Or equal
36	Lamp compl., (2001-1) With discs combd	{2001-47 or 2001-38}	1	In U.S.-Layout A-AA
37	" " , " " "	2001-44	1	In Canada-" A-AA
38	" (2001-1) Without " "	{2001-45 or 2001-36}	1	In U.S. Layout-B
39	" " , " " "	2001-42	1	In Canada " "
40	Lug, switch point-112-127-131 lb. rail	3006-2	1	Sw. cir. contr. conn.
41	" , " " -105 lb. rail	3006-3	1	" " " "
42	Pipe, 1 in. signal with plug & coupl'g	10155	200	✱ Note: L
44	Pin, jaw	10105	10	
47	Rod compl., cross connection	3896-2	1	Center of turnout
48	" " ., derail "	3896-3	1	At derail
49	" " ., Throw "	3002-10	1	At switch point
50	" " ., Switch circuit contr	3905-1	1	Short
51	" " ., " " "	3905-2	1	Long-when req'd
52	" " ., Target Layout-C	2721-1	1	Low banner target
53	" " ., " " -AA	2721-2	1	Low disc target
54	" " ., " " -A	2721-1	1	High " "
55	" " ., " " -B	2721-3	1	High banner target
59	Rivet, ¼x1 1/16 (1 in. pipe)	10153	30	✱ Note: L
60	Stud, ball (see plan 3006)	12711	1	Circuit con. rods
61	Strap, tie-short straight	3909-12	3	Cir. locn. and derail
62	" . " - " set	3909-13	1	Center location
63	" " -long straight	3909-11	2	Point of switch
65	Stand, crank-with center pin only	AAR 10882	4	
66	" , low disc target Layout-AA	AAR 13995	1	Without Lamp
67	" , high " " " -A	AAR 13997	1	" "
68	" , " banner " " -B	2720-1	1	" "
69	" , low " " " -C	2720-2	1	Without lamp
70	Shims, rail only (as req'd-item 29-30)	3898A	2	100-105-112-115 lb. rail
71	Spike, cut track	E/C G-9	6	At derail
72	Spike, screw	E/C G-32	32	Derail-Tie straps
73	Washer, S. spg. washer, ⅝ in., ASA-med.		10	For items 33, 34, 49
74	" , " " " , ¾ in., " "		10	For item 2
75	" , cast iron	AAR 14581	10	For item 2
	SUPPLEMENTARY FOR LAYOUT-E			
81	Bolt, Sw. Point ¾ x 4¼, 105-115 lb.	3001 Item Z		Closed point side
82	" ⅞x4¾, 112-127 lb. " "	" " X	2	" "
83	" 1x4¾, 112-127-131 lb. " "	" " V	2	" " "
85	Rod compl., Front, 105-115 lb.	3001-3	1	Switch, ¾ pt. bolts
86	" " ., " , 112-127 lb.	3001-1	1	" , ⅞ pt. "
87	" " ., " , 112-127-131 lb.	3001-2	1	" , 1 pt. "

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

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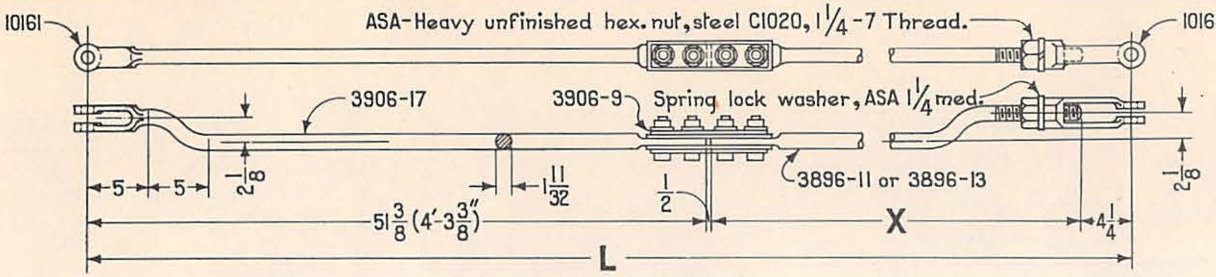
B.& A.R.R.
P.& L.E.R.R.

3890A
1-15-1948

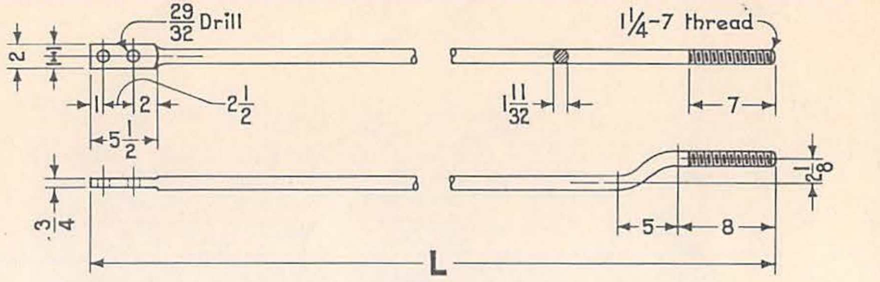
DERAIL LAYOUT
BLOCK TYPE
NON-INTERLOCKED — SWITCH CONNECTED

Approved by Representatives of lines shown.
J. Kearon
Chairman

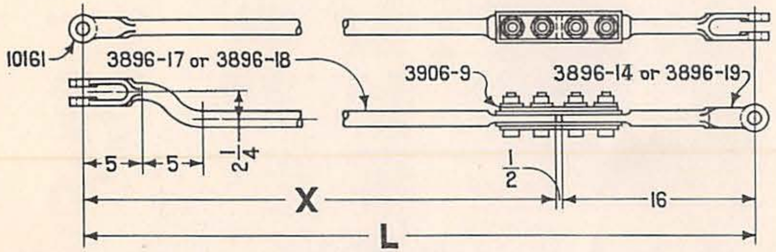
Printed in U.S.A.


10161
ASA-Heavy unfinished hex. nut, steel C1020, 1¼-7 Thread.
10164
3906-17
3906-9
Spring lock washer, ASA 1¼ med.
5
5
2⅛
1 11/32
½
3896-11 or 3896-13
2⅛
51⅜ (4'-3⅜")
X
4¼
L

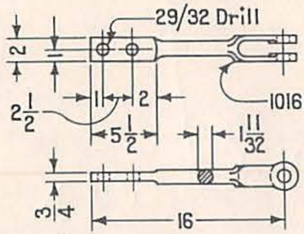
3896-1 CROSS CONNECTING ROD ONLY-Insulated. **X**=56⅝
3896-2 " " " **COMPL.**-With screw jaw, nut and spring lock washer.-**L**=112¾ **X**=56⅝
3896-4 " " " **ONLY**-Insulated. **X**=59⅞
3896-5 " " " **COMPL.**-With screw jaw, nut and spring lock washer.-**L**=116 **X**=59⅞
For Layouts 3700, 3710 and 3890.


29/32 Drill
1¼-7 thread
2
¾
1
2
2½
5½
1 11/32
7
2⅛
¾
5
8
L

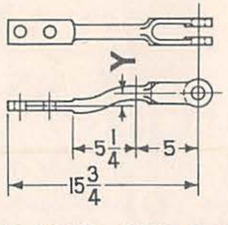
3896-11 THREADED HALF-ROD With splice end **L**=56⅝
3896-13 " " " " " " **L**=59⅞


10161
3896-17 or 3896-18
3906-9
3896-14 or 3896-19
5
5
2¼
½
16
X
L

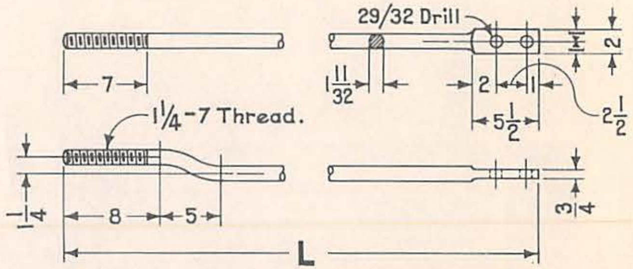
3896-3 DERAIL CONNECTING ROD COMPL.-Insulated.-**L**=63½ **X**=47 - With 3896-14
3896-8 " " " " - " -**L**=66¾ **X**=50¼- " "
3896-9 " " " " - " -**L**=63½ **X**=47 - " 3896-19
3896-10 " " " " - " -**L**=66¾ **X**=50¼- " "
(For Layout 3890)


29/32 Drill
2
¾
2½
1
2
5½
10161
1 11/32
¾
16

3896-14 SOLID JAW ROD



3896-12 SOLID JAW ROD-**Y**=1⅛
3896-19 " " " -**Y**=1⅞
(Formed from 3896-14)

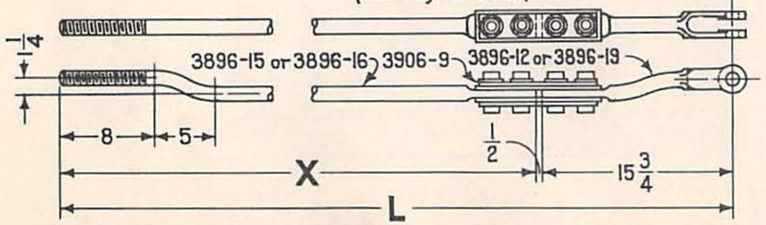

29/32 Drill
7
1 11/32
2
1
2
¾
5½
2½
1¼-7 Thread.
1¼
8
5
¾
L

3896-15 THREADED HALF-ROD-**L**=39¾
3896-16 " " " -**L**=43

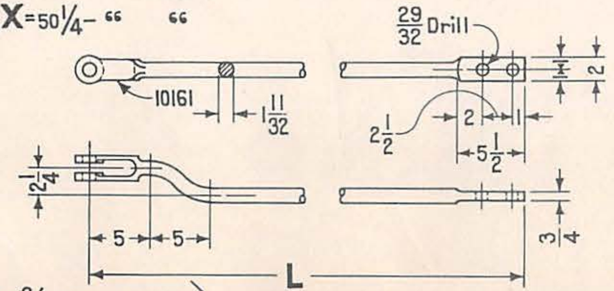
NOTES:
1. All rods to be of C1020 steel.
2. Protective treatment shall be in accordance with Instruction 350.
3. Spring lock washers to be carbon steel.
4. External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.

0 3 6 12 24 inches

All dimensions given in inches


1¼
3896-15 or 3896-16
3906-9
3896-12 or 3896-19
8
5
½
15¾
X
L

3896-6 DERAIL CONNECTING ROD COMPL.-Insulated.-**L**=56 **X**=39¾-With 3896-12
3896-7 " " " " - " **L**=59¼ **X**=43- " "
3896-20 " " " " - " **L**=56 **X**=39¾- " 3896-19
3896-21 " " " " - " **L**=59¼ **X**=43- " "
(For Layout 3870)


29/32 Drill
10161
1 11/32
¾
2
2½
2
1
5½
2¼
5
5
¾
L

3896-17 SOLID JAW ROD-**L**=47
3896-18 " " " -**L**=50¼

NEW YORK CENTRAL SYSTEM

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M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

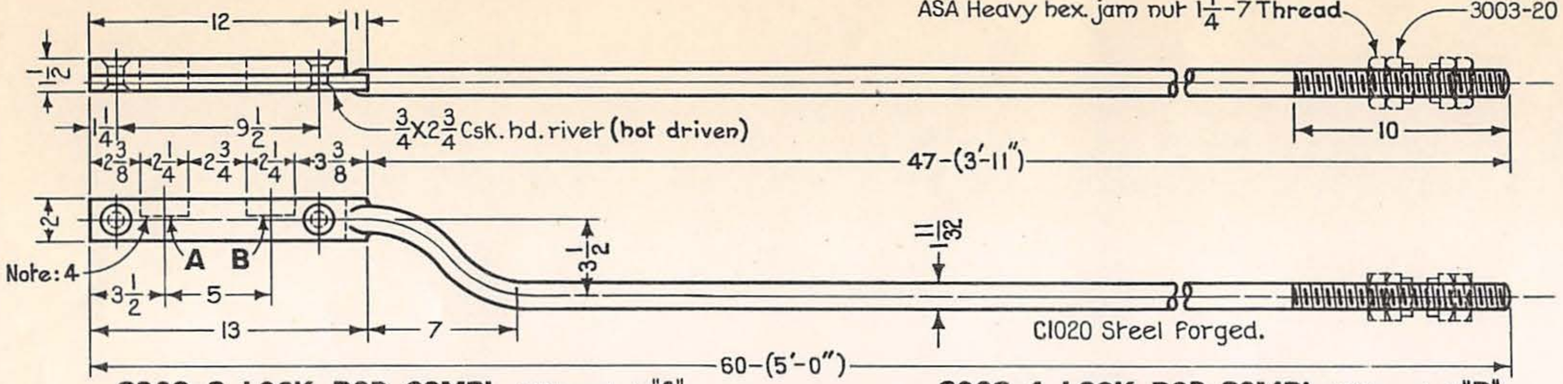
3896B

4-12-1946
1-17-1951

CONNECTING RODS

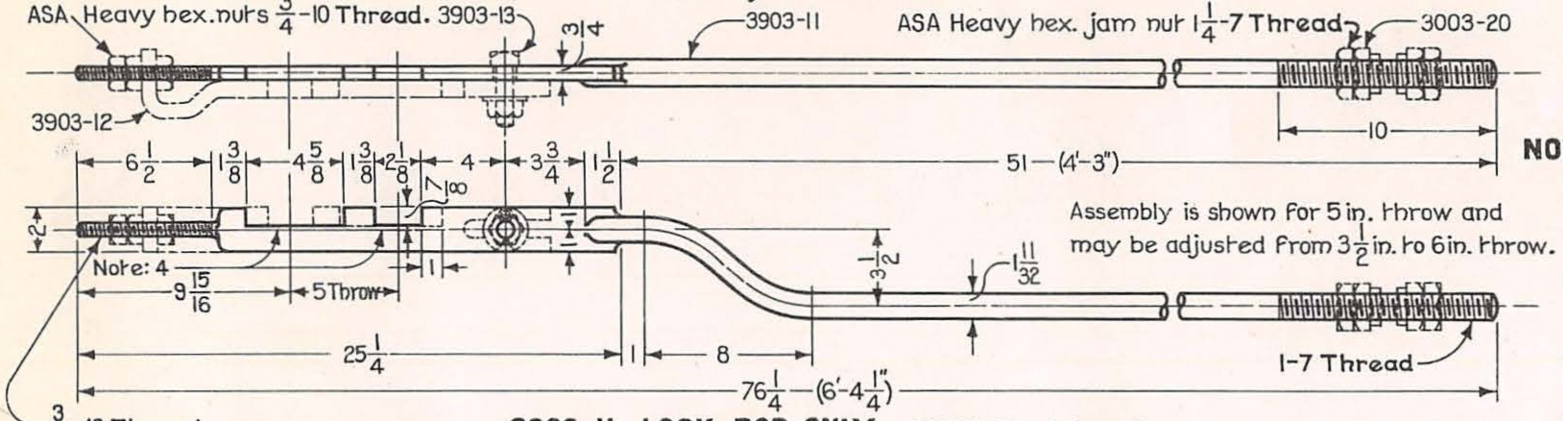
Approved by Representatives of lines shown.
JJKoreora
Chairman.

Printed in U.S.A.



12
1
1/2
ASA Heavy hex. jam nut 1 1/4-7 Thread
3003-20
1 1/4
9 1/2
3/4 X 2 3/4 Csk. hd. rivet (hot driven)
10
2 3/8
2 1/4
2 3/4
2 1/4
3 3/8
47-(3'-11")
2
A
B
Note: 4
3 1/2
1 11/32
3 1/2
5
13
7
C1020 Steel forged.
60-(5'-0")

3903-3 LOCK ROD COMPL. With notch "**A**" (For Layouts 3700 and 3710) **3903-4 LOCK ROD COMPL.** With notch "**B**"



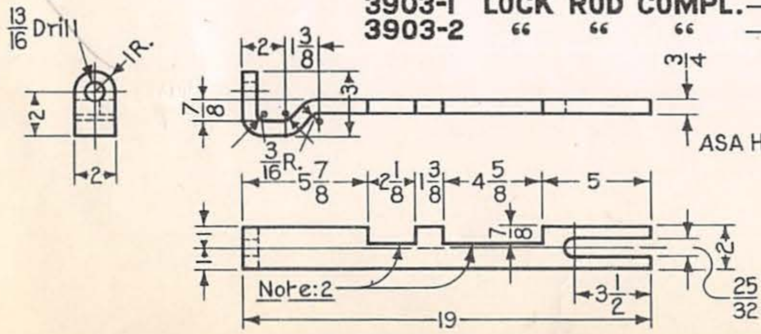
ASA Heavy hex. nuts 3/4-10 Thread.
3903-13
3/4
3903-11
ASA Heavy hex. jam nut 1 1/4-7 Thread
3003-20
3903-12
10
6 1/2
1 3/8
4 5/8
1 3/8
2 1/8
4
3 3/4
1 1/2
51-(4'-3")
7/8
2
1 1/2
1
Note: 4
9 15/16
5 Throw
3 1/2
1 11/32
25 1/4
1
8
1-7 Thread
76 1/4-(6'-4 1/4")
3/4-10 Thread

Assembly is shown for 5 in. throw and may be adjusted from 3 1/2 in. to 6 in. throw.

3903-11 LOCK ROD ONLY—C1020 Steel forged.

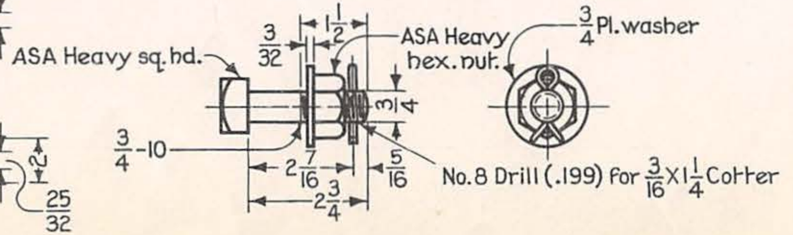
3903-1 LOCK ROD COMPL.—With lock plate, 3/4 in. nuts and bolt 3903-13.

3903-2 " " " —With lock plate, 3/4, 1 1/4 in. nuts and bolt 3903-13.



13/16 Drill
1 R.
2
2
2
1 3/8
3/4
7/8
3
3/16 R.
5 7/8
2 1/8
1 3/8
4 5/8
5
7/8
1
2
25/32
Note: 2
3 1/2
19

3903-12 LOCK PLATE
C1020 Steel Forged



ASA Heavy sq. hd.
3/32
1 1/2
ASA Heavy hex. nut.
3/4 Pl. washer
3/4
3/4-10
2 7/16
5/16
2 3/4
No. 8 Drill (.199) for 3/16 X 1 1/4 Cotter

3903-13 BOLT COMPL.—C1020

0 3 6 12 inches

NOTES:

1. External threads shall be ASA-UNC-2A with rounded root throughout.
   Internal threads shall be ASA-UNC-2B.
2. All nuts to be C1020, shall be hot forged, cold trimmed, normalized, chamfered and faced.
3. Protective treatment shall be in accordance with Instruction 350.
4. Locking notches must be accurate to dimensions free from burrs and have straight edges.

0 3 6 12 24 inches
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.Ry.
B.&A.R.R.
P.&L.E.R.R.

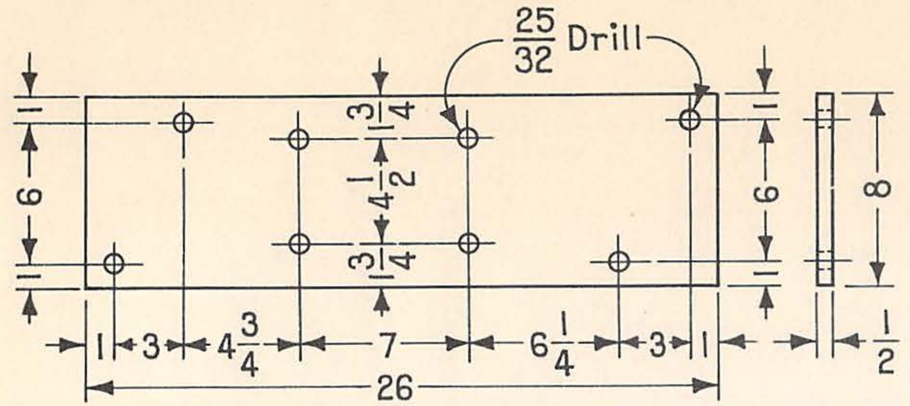
3903B
12-9-1938
5-14-1951

LOCK RODS
FOR MECHANICAL
SWITCH LAYOUTS

Approved by Representatives of lines shown.
Chairman

(Printed in U.S.A.)

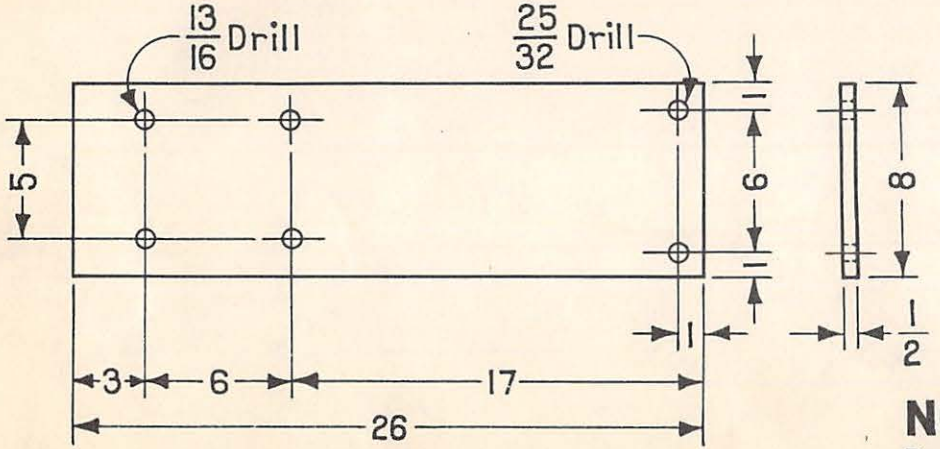
RECEIVED JUN 16 1952 SPECIFICATION DEPT.



25/32 Drill
1
6
1
3/4
4 1/2
3/4
6
1
1
8
1
3
4 3/4
7
6 1/4
3
1
1/2
26

3904-1 PLUNGER-LOCK PLATE

C1020 Steel-For Layouts 3700, 3710 and 3900



13/16 Drill
25/32 Drill
5
1
6
1
8
1
1/2
3
6
17
26

3904-2 CRANK STAND BASE PLATE

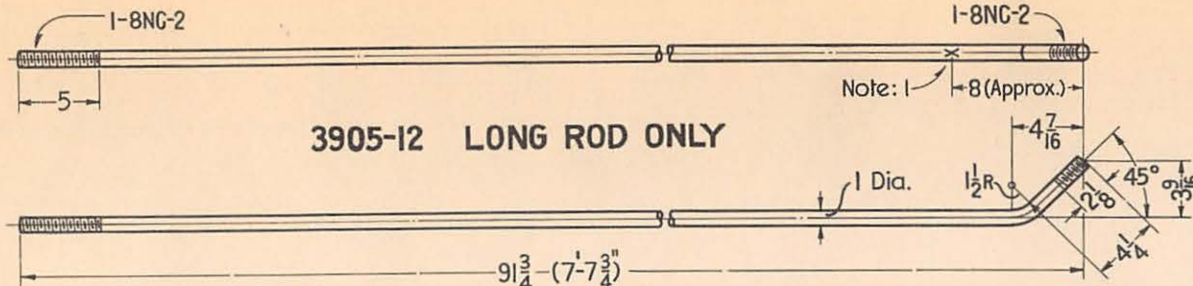
C1020 Steel-For Layouts 3700 and 3710

NOTE:
Protective treatment shall be in accordance with Instruction 350.

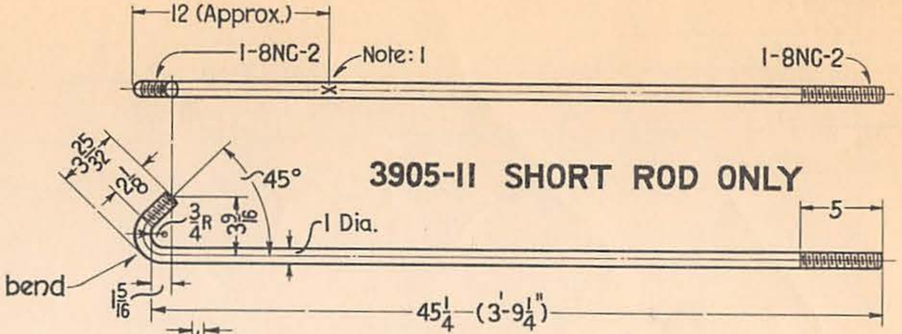
Scale: 1½ in.=1 ft.-All dimensions given in inches.

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&St.L.RY. B.&A.R.R. P.&L.E.R.R.	3904B 12-8-1938 2-5-1951
BASE PLATES	Approved by Representatives of lines shown. Chairman.	

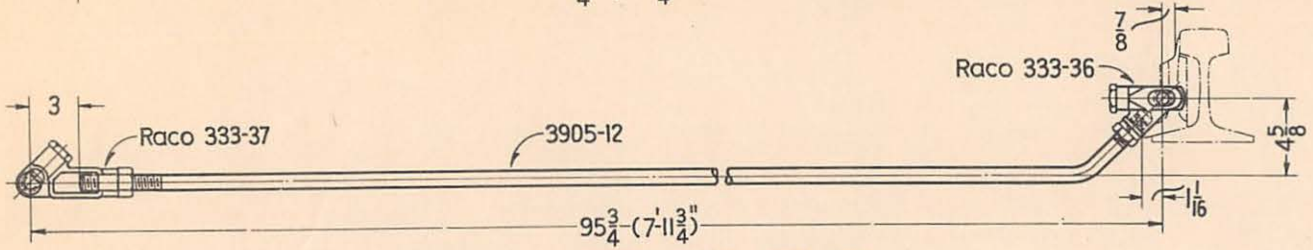
Printed in U.S.A.


1-8NC-2
1-8NC-2
5
Note: 1
8 (Approx.)
4 7/16
1 Dia.
1 1/2 R
45°
2 1/8
3 9/16
4 1/4
91 3/4 — (7'-7 3/4")

3905-12 LONG ROD ONLY

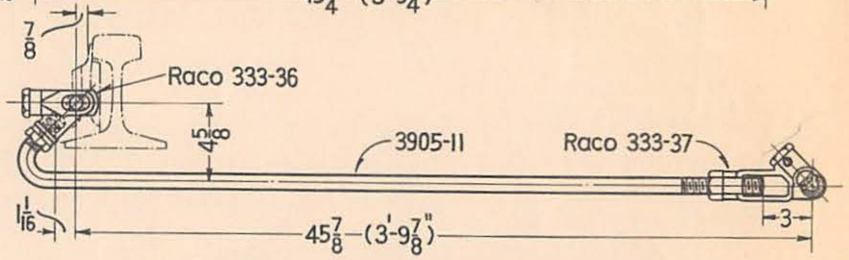

12 (Approx.)
1-8NC-2
Note: 1
1-8NC-2
3 25/32
2 1/8
45°
3/4 R
3 9/16
1 Dia.
5
Hot bend
1 5/16
45 1/4 — (3'-9 1/4")

3905-11 SHORT ROD ONLY


3
Raco 333-37
3905-12
Raco 333-36
7/8
4 5/8
1 1/16
95 3/4 — (7'-11 3/4")

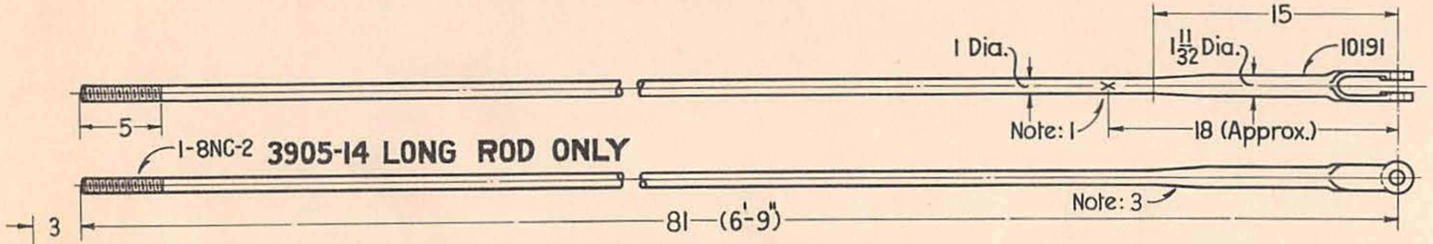
3905-2 LONG ROD COMPL.

For hand thrown switches.

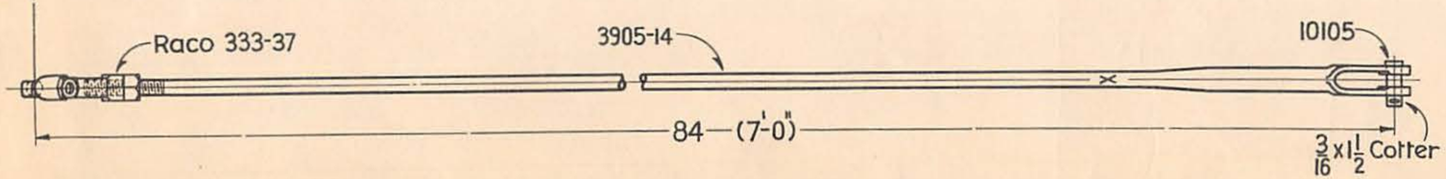

7/8
Raco 333-36
4 5/8
3905-11
Raco 333-37
1 1/16
45 7/8 — (3'-9 7/8")
3

3905-1 SHORT ROD COMPL.

For hand thrown and for mechanical interlocked switches.
For hand thrown specify length required.


15
1 Dia.
1 11/32 Dia.
10191
5
Note: 1
18 (Approx.)
1-8NC-2
Note: 3
3
81 — (6'-9")

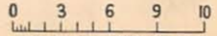
3905-14 LONG ROD ONLY


Raco 333-37
3905-14
10105
84 — (7'-0")
3/16 x 1 1/2 Cotter

3905-4 LONG ROD COMPL. ________ For mechanical interlocked Hayes derail.

NOTES:

1. Manufacturer's identification to be stamped on each rod at 'X'.
2. Protective treatment shall be in accordance with Instruction 350.
3. All rods to be of SAE-1020 steel without weld; 3905-14 weld permitted.
4. See 3006 for switch circuit controller and point-detector rod fittings.



Scale and dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

SWITCH CIRCUIT CONTROLLER RODS

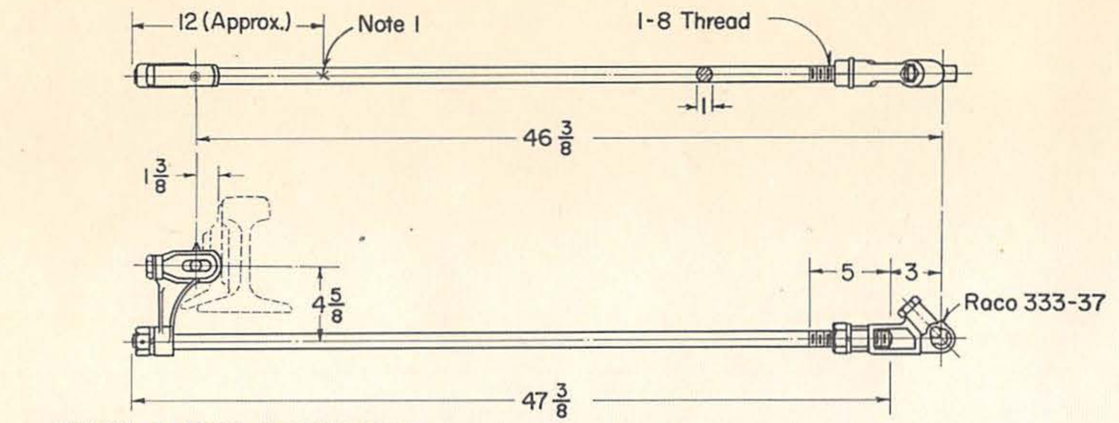
N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

3905

1	1-20-1939
2	3-6-1941

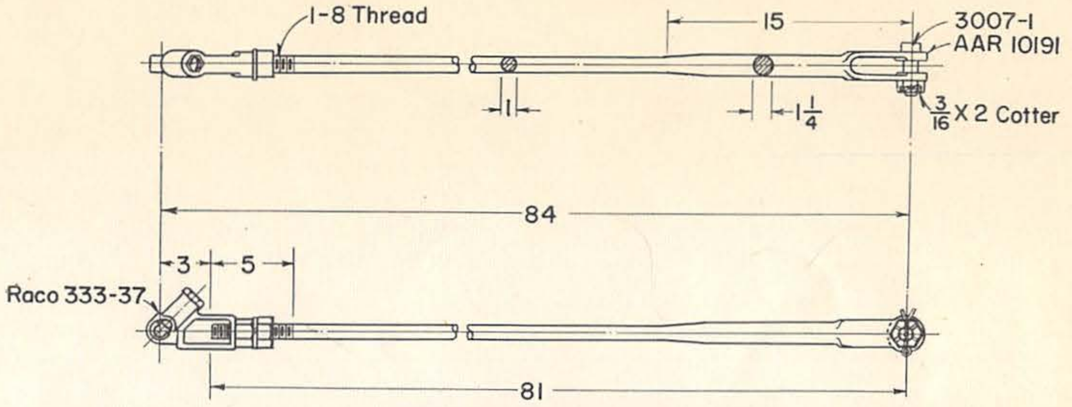
Approved by Representatives of Lines shown.
J.J.Corcoran
Chairman

Drawing revised and plan renumbered 3905 (7-12-38) was No. 5920 Issue: 1 (7-15-36)



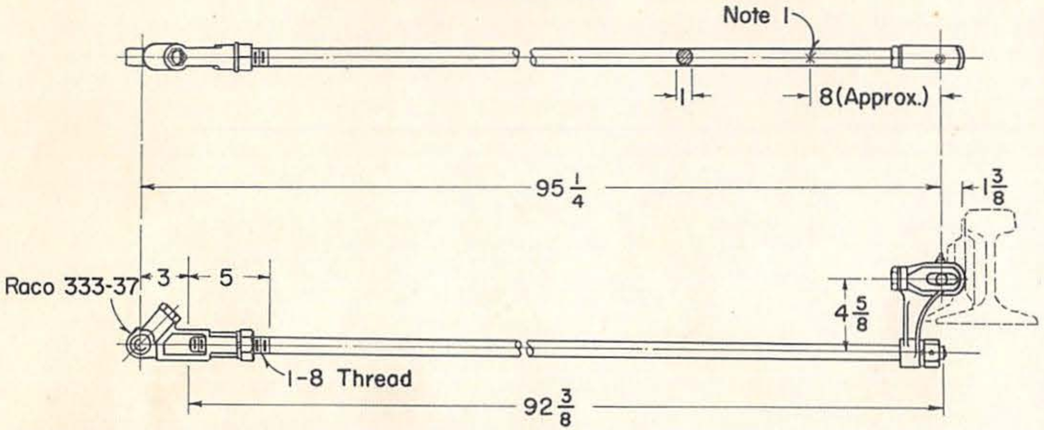
12 (Approx.)
Note 1
1-8 Thread
1
$46\frac{3}{8}$
$1\frac{3}{8}$
$4\frac{5}{8}$
5
3
Raco 333-37
$47\frac{3}{8}$

3905-1, ROD COMPLETE
3905-11, ROD AND POINT SOCKET ASSEMBLY ONLY
For Layouts 3890-3900



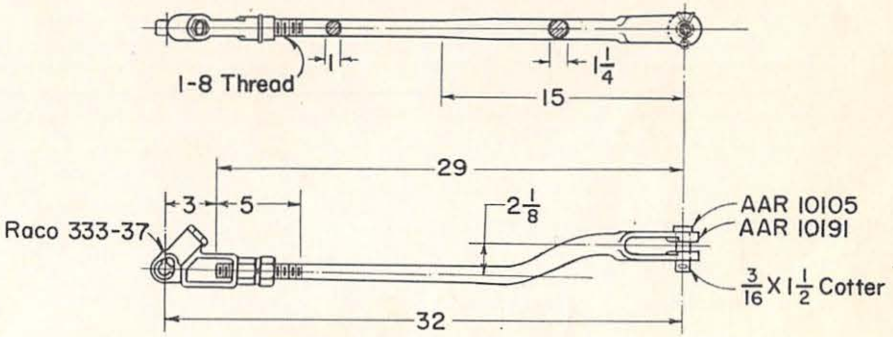
1-8 Thread
15
3007-1
AAR 10191
1
$1\frac{1}{4}$
$\frac{3}{16}$ X 2 Cotter
84
3
5
Raco 333-37
81

3905-4, ROD COMPLETE
3905-14, ROD ONLY
For mechanically interlocked block-type derail



Note 1
1
8 (Approx.)
$95\frac{1}{4}$
$1\frac{3}{8}$
Raco 333-37
3
5
$4\frac{5}{8}$
1-8 Thread
$92\frac{3}{8}$

3905-2, ROD COMPLETE
3905-12, ROD AND POINT SOCKET ASSEMBLY ONLY
For Layouts 3890-3900



1-8 Thread
1
$1\frac{1}{4}$
15
29
3
5
$2\frac{1}{8}$
Raco 333-37
AAR 10105
AAR 10191
$\frac{3}{16}$ X $1\frac{1}{2}$ Cotter
32

3905-5, ROD COMPLETE
3905-15, ROD ONLY
For Layout 3700

NOTES:

1. Manufacturers identification to be stamped on rods at "X" as specified.
2. External threads shall be ASA-UNC-2A with rounded root throughout. Internal threads shall be ASA-UNC-2B.
3. For rods other than shown, specify rod number and length required.
4. All rods to be of 1335 steel without weld; factory weld permitted on 3905-14 and 3905-15.
5. Portions which have been subjected to forging or welding operations to be normalized.
6. Rods must not be welded or reformed after manufacture.
7. Protective treatment - Primer, Item 31, Instruction 350.

0 6 12 18 24
All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL DEPARTMENT
SWITCH CIRCUIT CONTROLLER RODS

Approved ____________
Chief Signal Engineer

S-3905

Printed in U.S.A.

ISSUED 6-1-54

SHEET 1 OF 2

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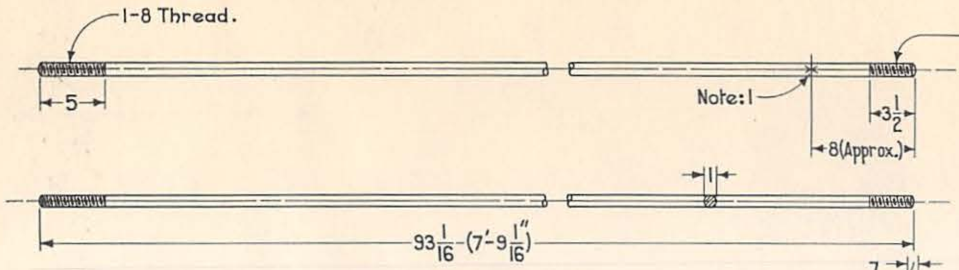
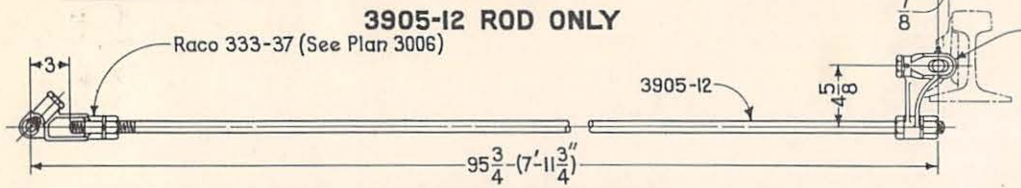
JUL 19 1954
CUSTOMER SERVICES DEPT.
ORD. SECT.



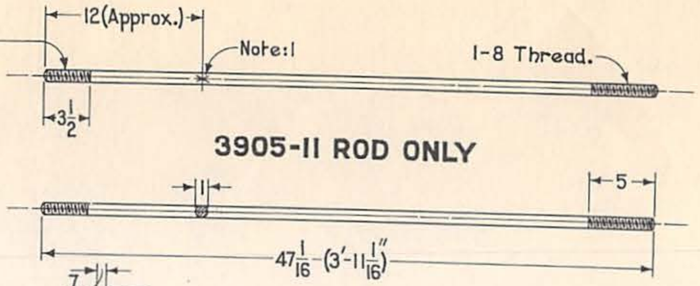
1-8 Thread.
1-8 Thread
Note: 1
5
$3\frac{1}{2}$
8 (Approx.)
1
$93\frac{1}{16}$-(7'-9$\frac{1}{16}$")

3905-12 ROD ONLY



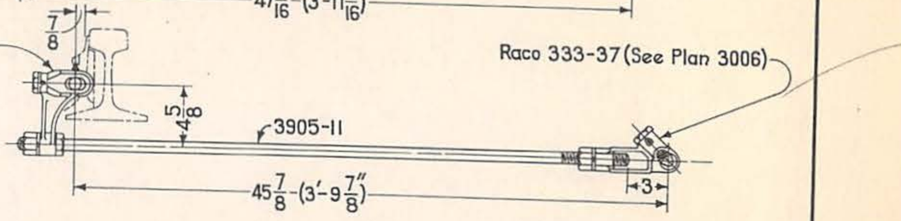
Raco 333-37 (See Plan 3006)
3
3905-12
$\frac{7}{8}$
$4\frac{5}{8}$
$95\frac{3}{4}$-(7'-11$\frac{3}{4}$")
Raco 333-87
(See Plan 3006)

3905-2 ROD COMPL.
For Layouts 3890-3900



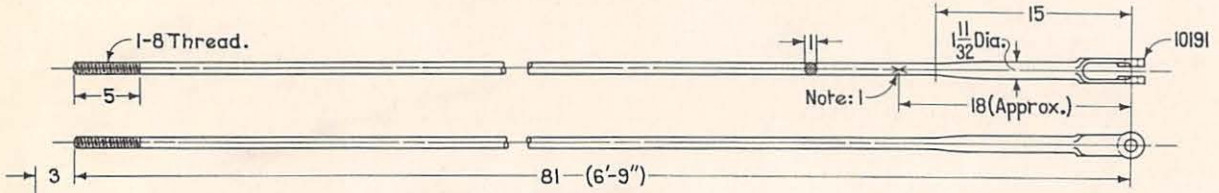
12 (Approx.)
Note: 1
1-8 Thread.
$3\frac{1}{2}$
1
5
$47\frac{1}{16}$-(3'-11$\frac{1}{16}$")

3905-11 ROD ONLY



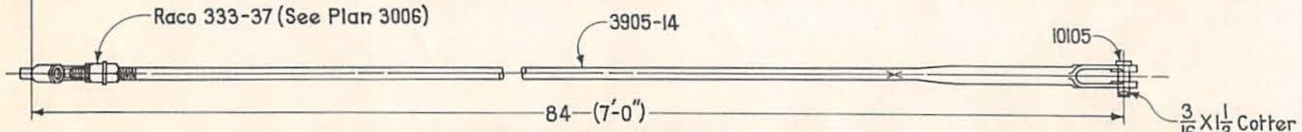
$\frac{7}{8}$
$4\frac{5}{8}$
Raco 333-37 (See Plan 3006)
3905-11
$45\frac{7}{8}$-(3'-9$\frac{7}{8}$")
3

3905-1 ROD COMPL.
For Layouts 3890-3900



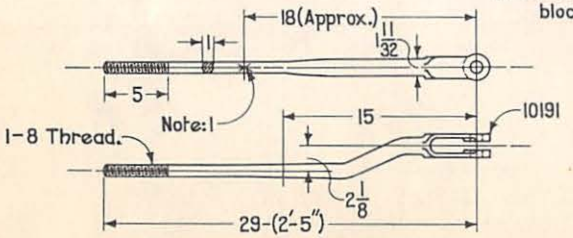
1-8 Thread.
5
1
Note: 1
15
$1\frac{11}{32}$ Dia.
18 (Approx.)
10191
3
81—(6'-9")

3905-14 ROD ONLY



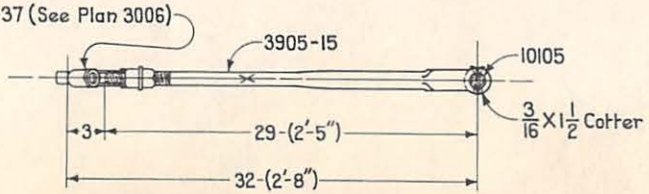
Raco 333-37 (See Plan 3006)
3905-14
10105
84—(7'-0")
$\frac{3}{16}$ X $1\frac{1}{2}$ Cotter

3905-4 ROD COMPL.
For mechanically interlocked
block-type derail



18 (Approx.)
1
$1\frac{11}{32}$
5
Note: 1
1-8 Thread.
15
10191
$2\frac{1}{8}$
29-(2'-5")

3905-15 ROD ONLY



Raco 333-37 (See Plan 3006)
3905-15
10105
$\frac{3}{16}$ X $1\frac{1}{2}$ Cotter
3
29-(2'-5")
32-(2'-8")

3905-5 ROD COMPL.
For Layout 3700

NOTES:

1. Manufacturers identification to be stamped on each rod at "X".
2. External threads shall be ASA-UNC-2A with rounded root throughout.
   Internal threads shall be ASA-UNC-2B.
3. For rods other than shown, specify rod number and length required.
4. All rods to be of 1335 steel without weld; Factory weld permitted on 3905-14 and 3905-15.
5. Portions which have been subjected to forging operations to be normalized.
6. Rods must not be welded or reformed after manufacture.
7. See 3006 for switch circuit controller and point-detector rod fittings.
8. Protective treatment shall be in accordance with Instruction 350.

0 3 6 12 inches
Scale and dimensions given in inches

NEW YORK
CENTRAL
SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST L.RY.
B.&A.R.R.
P.&L.E.R.R.

3905D

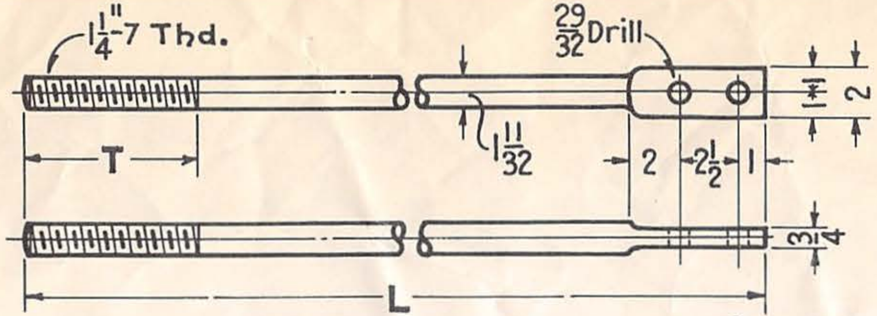
1-20-1939
3-6-1941
4-8-1946
1-17-1951

SWITCH CIRCUIT CONTROLLER RODS

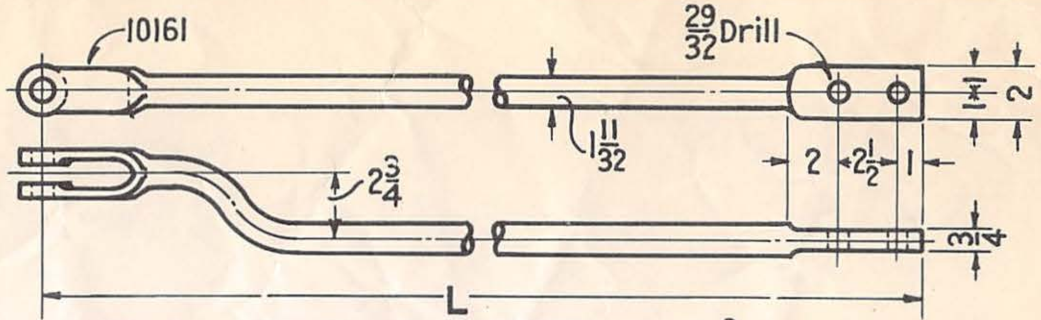
Approved by Representatives of lines shown.

Chairman.

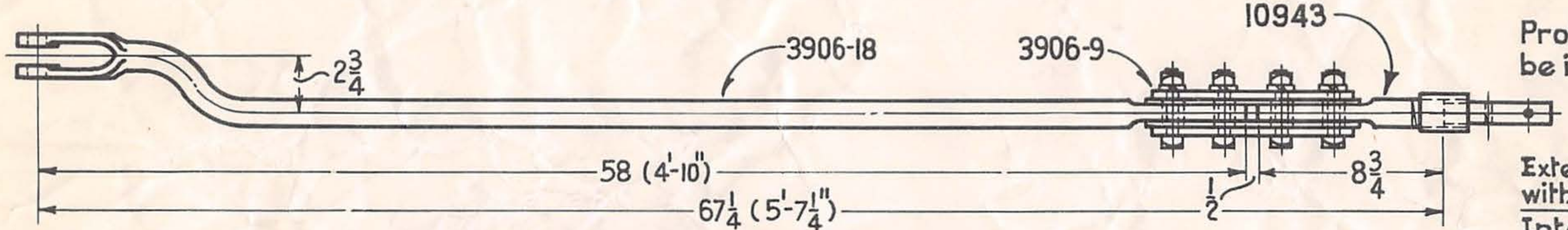
Printed in U.S.A.


1¼"-7 Thd.
29/32 Drill
T
1 11/32
2
2½
1
1¼
2
¾
L

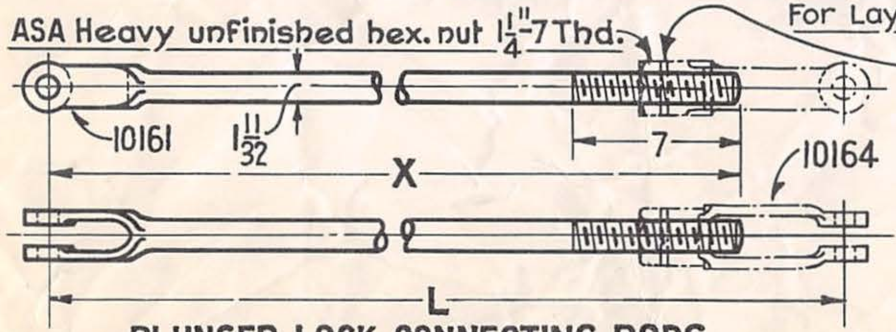
3906-15 THREADED ROD — T = 7 — L = 55¾ Splice end
3906-16 " " — T = 19 — L = 74¾ "


10161
29/32 Drill
1 11/32
2¾
2
2½
1
1¼
2
¾
L

3906-17 SOLID JAW ROD — L = 51⅜ Splice end
3906-18 " " " — L = 58 "


10943
3906-18
3906-9
2¾
58 (4'-10")
67¼ (5'-7¼")
½
8¾

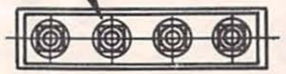
3906-5 CROSS CONNECTING ROD COMPL. Insulated
For Layout 3900


ASA Heavy unfinished hex. nut 1¼"-7 Thd.
Spring Lock Washer ASA Medium
10161
1 11/32
7
X
10164
L

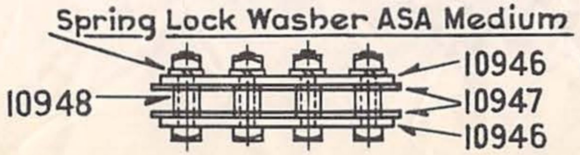
PLUNGER LOCK CONNECTING RODS

ROD COMPL. with screw jaw and nut				ROD ONLY	
ORD. NO.	L	For connections	Layout	ORD. NO.	X
3906-1	33¾	A and B	3900	**3906-11**	29½
3906-2	35¼	C and D	3900	**3906-12**	31
3906-3	62	Item 61	3700	**3906-13**	57¾

ASA Regular ⅝"-11 Thd. x 2½ Sq. hd. bolt and nut



Scale: 1½ in. = 1 ft.
All dimensions given in inches.


Spring Lock Washer ASA Medium
10948
10946
10947
10946

3906-9 ASSEMBLY INSULATING SPLICE PARTS COMPL.

Protective treatment shall be in accordance with Instruction 350.

NOTES

External threads shall be ASA-UNC-2A with rounded root throughout.

Internal threads shall be ASA-UNC-2B.

Rods to be forged without weld.

Rods and Bolts to be C1020 Steel.

Spring Lock Washers to be Carbon Steel.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

3906B

12-6-1938
10-5-1951

CONNECTING RODS

Approved by Representatives of Lines shown.
J. J. Corcoran
Chairman

Printed in U.S.A.

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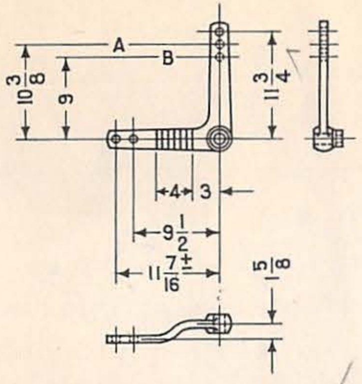
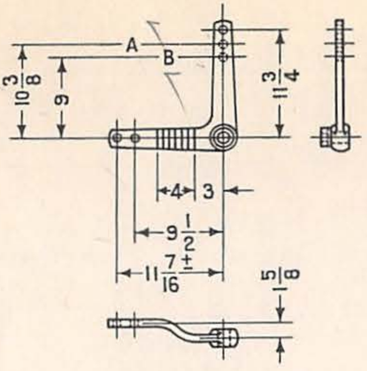
MAILING DEPT.
SEP 30 1952
P.M.
Ans'd
Date


A
B
10 3/8
9
11 3/4
4
3
9 1/2
11 7/16 ±
1 5/8

3907-11 CRANK
For Layouts 3700, 3890 and 3900

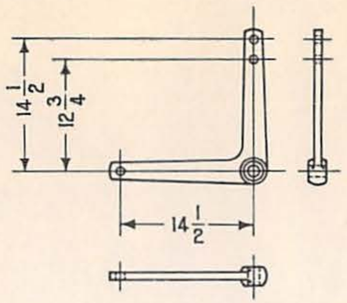
3907-15 CRANK
With holes "A" and "B"
(A.A.R.10076 modified)
For Layout 3010


A
B
10 3/8
9
11 3/4
4
3
9 1/2
11 7/16 ±
1 5/8

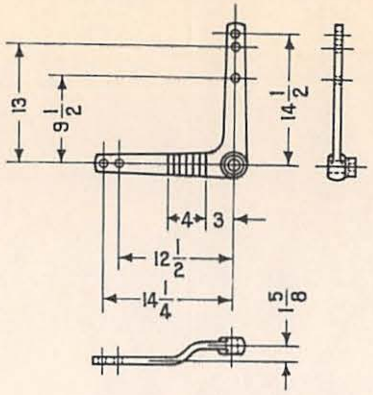
3907-12 CRANK
For Layouts 3890 and 3900

3907-16 CRANK
With holes "A" and "B"
(A.A.R.10076 modified)
For Layouts 3010, 3700

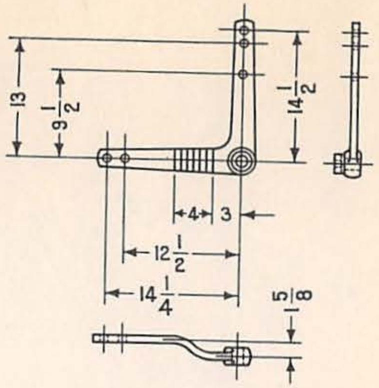
15 & 16 FOR PRICE ONLY 13017


14 1/2
12 3/4
14 1/2

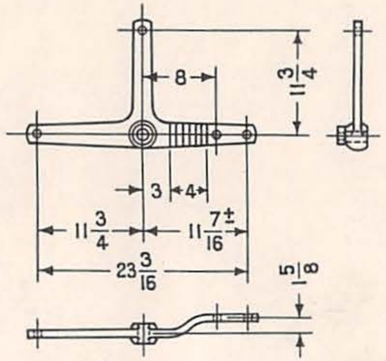
3907-14 CRANK
(A.A.R.10077 modified)
For right or left-hand
Layout 3890


13
9 1/2
14 1/2
4
3
12 1/2
14 1/4
1 5/8

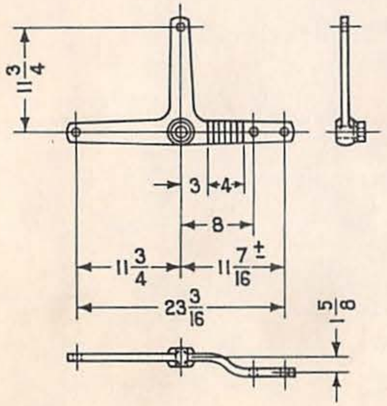
3907-20 CRANK
For Layout 3890
(A.A.R.10077 modified)


13
9 1/2
14 1/2
4
3
12 1/2
14 1/4
1 5/8

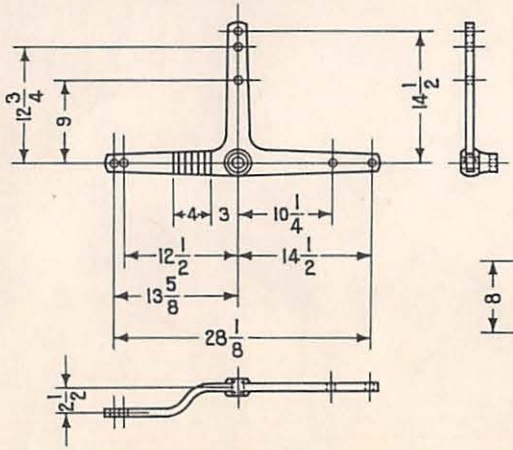
3907-21 CRANK
For Layout 3890
(A.A.R.10077 modified)


8
11 3/4
3
4
11 3/4
11 7/16 ±
23 3/16
1 5/8

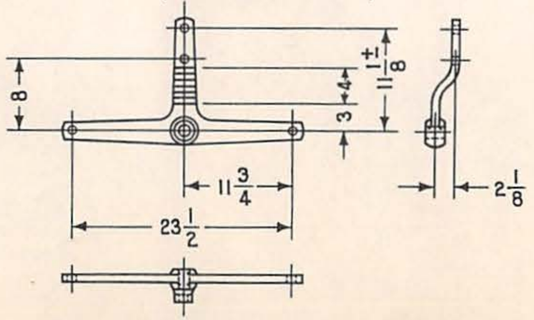
3907-22 THREE ARM CRANK
For Layout 3700
(A.A.R.10071 modified)


11 3/4
3
4
8
11 3/4
11 7/16 ±
23 3/16
1 5/8

3907-17 THREE ARM CRANK
For Layout 3700
(A.A.R.10071 modified)


12 3/4
9
14 1/2
4
3
10 1/4
12 1/2
14 1/2
13 5/8
28 1/8
2 1/2

3907-18 THREE ARM CRANK
For Layout 3870


8
3
4
11 1/8 ±
11 3/4
23 1/2
2 1/8

3907-19 THREE ARM CRANK
For Layout 3710
(A.A.R.10071 modified)

NOTES:

1. Protective treatment shall be in accordance with Instruction 350.
2. All holes for jaw connections to be drilled and reamed for 7/8" pin.

0 6 12 24 36 inches
All dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

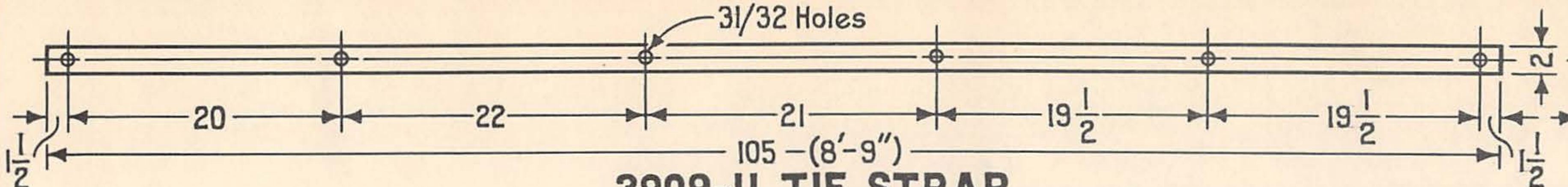
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3907C
12-8-1938
4-8-1938
12-10-1950

CRANKS

Approved by Representatives of lines shown.
Chairman.

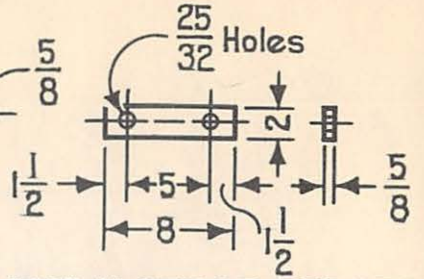
Printed in U.S.A.



31/32 Holes
20
22
21
19 1/2
19 1/2
105 – (8′-9″)
1 1/2
1 1/2
2
5/8

3909-11 TIE STRAP

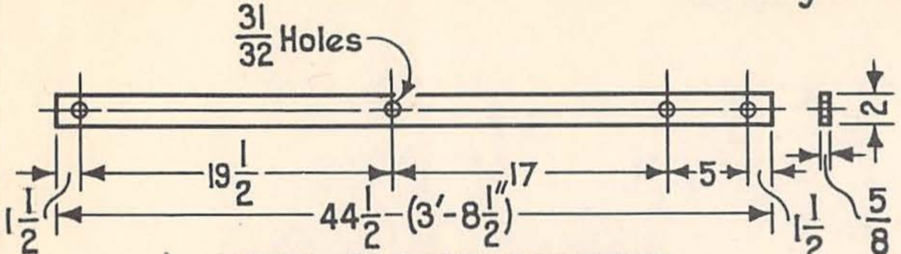
For Layouts 3000,3890,3900



25/32 Holes
2
5
8
1 1/2
1 1/2
5/8

3909-14 STRAP WASHER

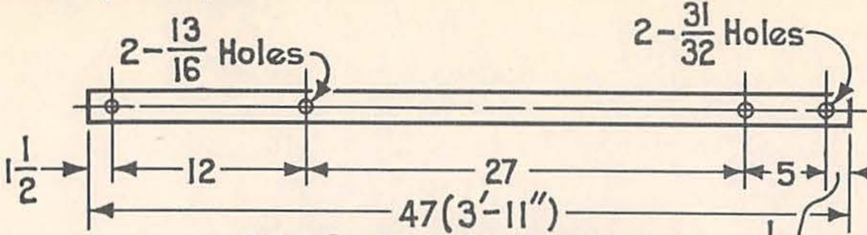
For Layout 3900



31/32 Holes
19 1/2
17
5
44 1/2 – (3′-8 1/2″)
1 1/2
1 1/2
2
5/8

3909-12 TIE STRAP

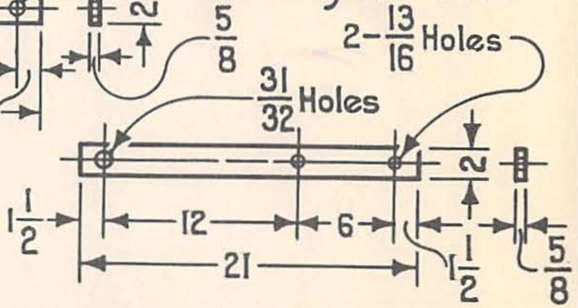
For Layouts 3000,3870,3890,3900



2–13/16 Holes
2–31/32 Holes
12
27
5
47 (3′-11″)
1 1/2
1 1/2
2
5/8

3909-15 TIE STRAP

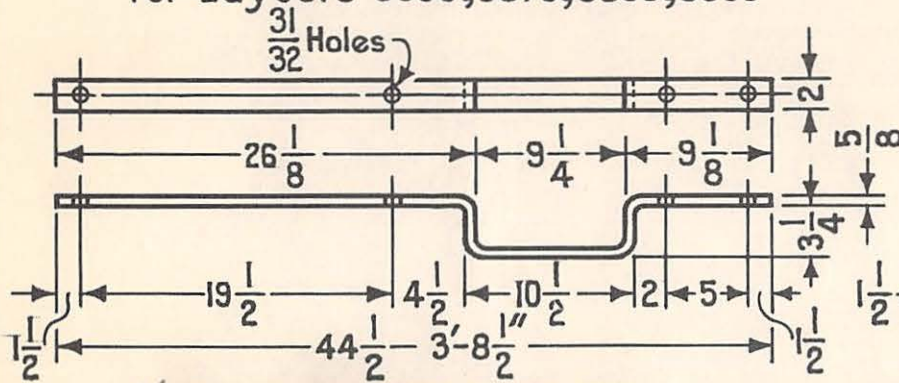
For Layout 3700



2–13/16 Holes
31/32 Holes
12
6
21
1 1/2
1 1/2
2
5/8

3909-17 TIE STRAP

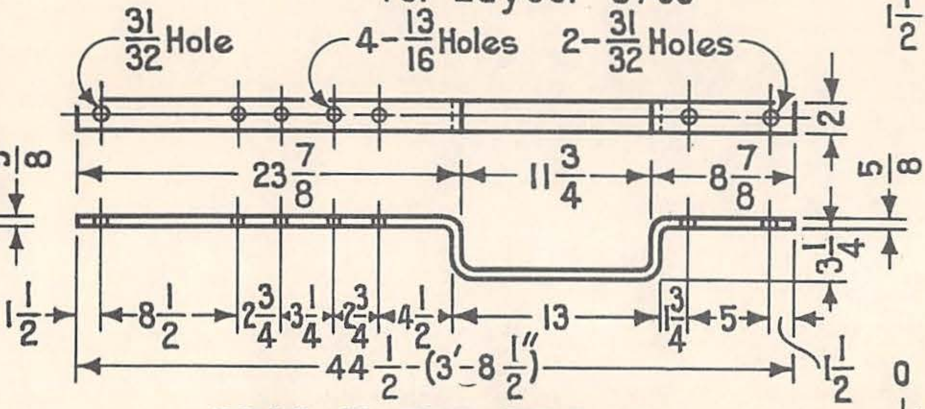
For Layouts 3010, 3700



31/32 Holes
26 1/8
9 1/4
9 1/8
19 1/2
4 1/2
10 1/2
2
5
44 1/2 – 3′-8 1/2″
1 1/2
1 1/2
2
5/8
3 1/4

3909-13 TIE STRAP

For Layouts 3000,3700,3890



31/32 Hole
4–13/16 Holes
2–31/32 Holes
23 7/8
11 3/4
8 7/8
8 1/2
2 3/4
3 1/4
2 3/4
4 1/2
13
1 3/4
5
44 1/2 – (3′-8 1/2″)
1 1/2
1 1/2
2
5/8
3 1/4

3909-16 TIE STRAP

For Layout 3010

0 3 6 12 24 inches

All dimensions given in inches

NOTES:

All material to be of C1020 steel.

Protective treatment shall be in accordance with Instruction 350.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

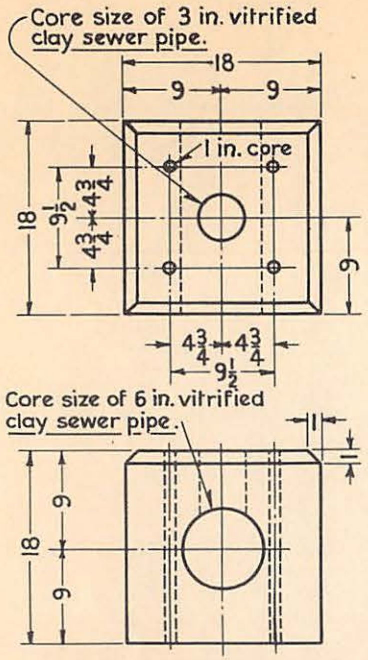
3909C

12-8-1938
4-8-1946
11-13-1950

TIE STRAPS

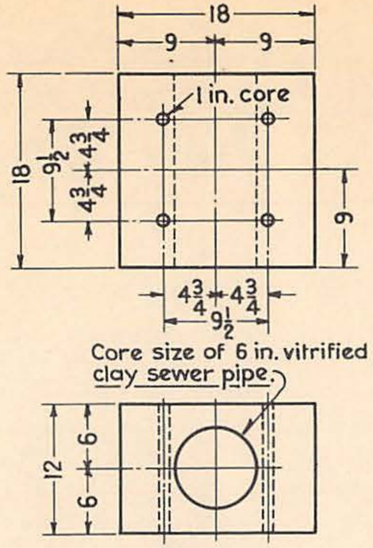
Approved by Representatives of lines shown.
Chairman.

Printed in U.S.A.


Core size of 3 in. vitrified clay sewer pipe.
18
9
9
1 in. core
18
$9\frac{1}{2}$
$4\frac{3}{4}$
$4\frac{3}{4}$
9
$4\frac{3}{4}$
$4\frac{3}{4}$
$9\frac{1}{2}$
Core size of 6 in. vitrified clay sewer pipe.
1
1
18
9
9

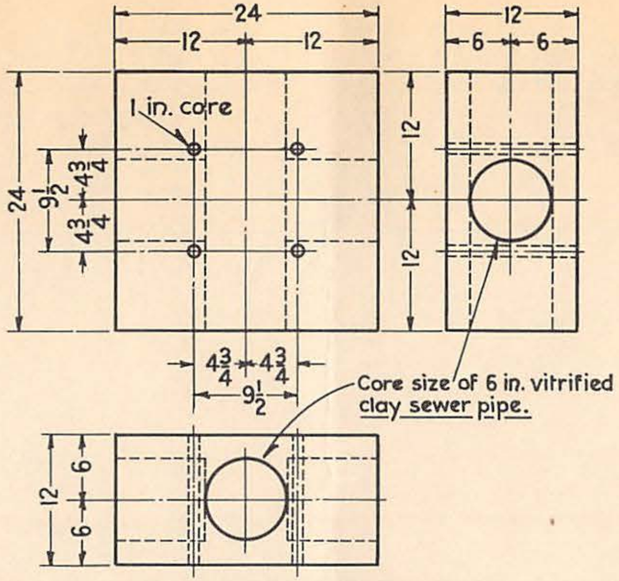
3920-1 TOP BLOCK

Approx. wt. 414 lb.


18
9
9
1 in. core
18
$9\frac{1}{2}$
$4\frac{3}{4}$
$4\frac{3}{4}$
9
$4\frac{3}{4}$
$4\frac{3}{4}$
$9\frac{1}{2}$
Core size of 6 in. vitrified clay sewer pipe.
12
6
6

3920-2
INTERMEDIATE BLOCK

Approx. wt. 264 lb.

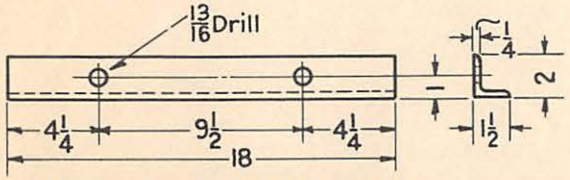

24
12
12
12
6
6
1 in. core
24
$9\frac{1}{2}$
$4\frac{3}{4}$
$4\frac{3}{4}$
12
12
$4\frac{3}{4}$
$4\frac{3}{4}$
$9\frac{1}{2}$
Core size of 6 in. vitrified clay sewer pipe.
12
6
6

3920-3 BASE BLOCK

Approx. wt. 441 lb.

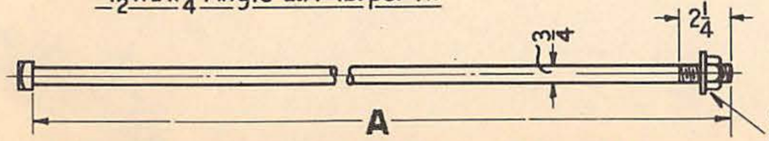
SPECIFICATIONS

Foundations shall be made of Portland cement concrete in accordance with N.Y. C. Specifications B-2, Index C4.
Proportions of ingredients shall be as follows:
1 Part Portland cement.
2 Parts sand.
3 Parts stone or gravel, $\frac{3}{4}$ in. max. size.
Not more than 5 gallons of water shall be used to each sack of cement.


$\frac{13}{16}$ Drill
$4\frac{1}{4}$
$9\frac{1}{2}$
$4\frac{1}{4}$
18
$\frac{1}{4}$
2
$1\frac{1}{2}$

3920-4 ANCHOR IRON

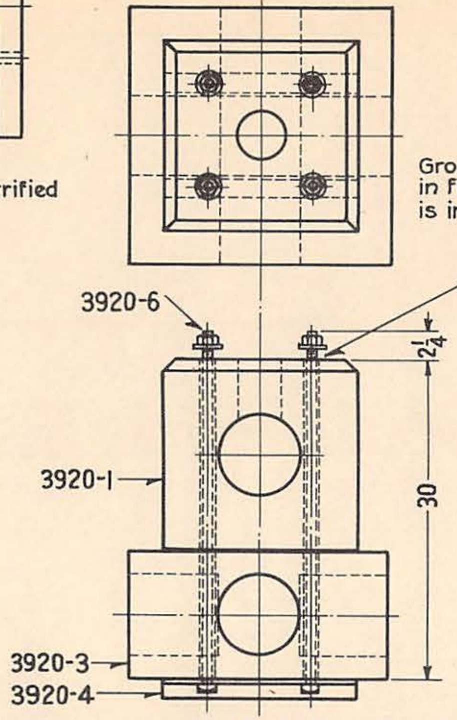
$1\frac{1}{2} \times 2 \times \frac{1}{4}$ Angle 2.77 lb. per ft.


$\frac{3}{4}$
$2\frac{1}{4}$
A

$\frac{3}{4}$"-10NC-2-Regular unfinished sq. hd. bolt with hex. nut and plate washer.

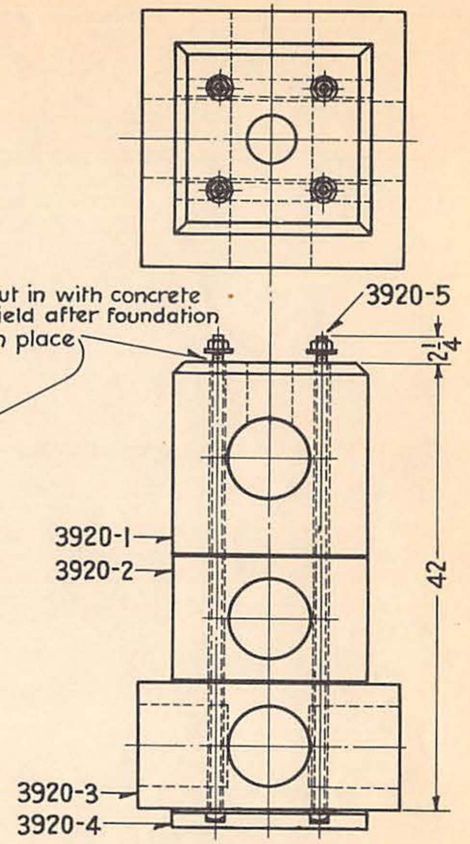
3920-5 ANCHOR BOLT — A = $44\frac{1}{2}$ in.
3920-6 " " — A = $32\frac{1}{2}$ in.

O. H. Steel - Hot galvanized.


3920-6
$2\frac{1}{4}$
3920-1
30
3920-3
3920-4

3920-7
2-UNIT FOUNDATION COMPL.

Foundations should be set on solid ground.


Grout in with concrete in field after foundation is in place
3920-5
$2\frac{1}{4}$
3920-1
3920-2
42
3920-3
3920-4

3920-8
3-UNIT FOUNDATION COMPL.

Use foundation 3920-8 at locations where slope or fill make it necessary to excavate more than 2 ft. 6 in. deep.

When ordering parts give number and name shown in large type.

0 2 4 6 12
0 3 6 9 12
Scales: and dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

FOUNDATIONS
PRECAST CONCRETE
For Highway Crossing Signals

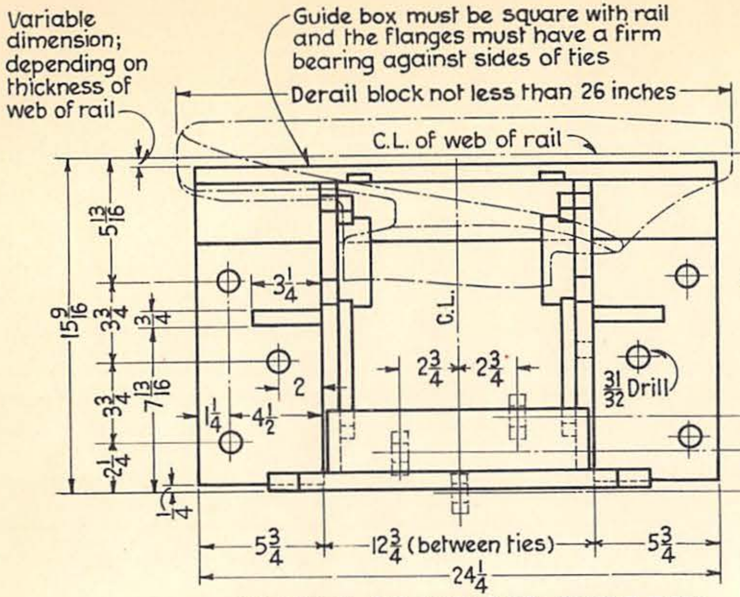
N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

3920

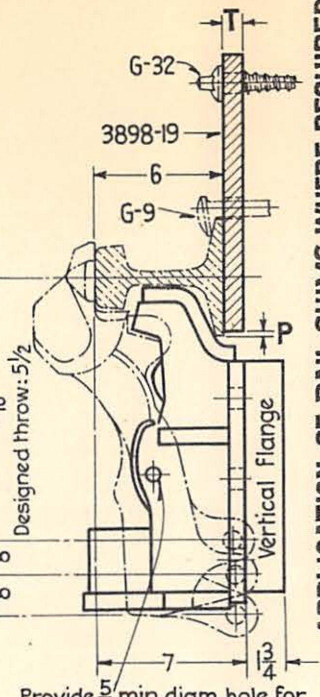
ISSUE	DATE
1	4-20-1937

Approved by Representatives of Lines shown.
Chairman

3898A (11-11-1946)
Supersedes old
5606A (3-18-1936)


Variable dimension; depending on thickness of web of rail
Guide box must be square with rail and the flanges must have a firm bearing against sides of ties
Derail block not less than 26 inches
C.L. of web of rail
C.L.
$5\frac{13}{16}$
$15\frac{9}{16}$
$3\frac{3}{4}$
$3\frac{3}{4}$
$3\frac{1}{4}$
$7\frac{13}{16}$
$2\frac{1}{4}$
$\frac{1}{4}$
$3\frac{1}{4}$
2
$1\frac{1}{4}$
$4\frac{1}{2}$
$2\frac{3}{4}$
$2\frac{3}{4}$
$\frac{31}{32}$ Drill
$12\frac{5}{16}$
$1\frac{5}{8}$
$1\frac{7}{8}$
$5\frac{3}{4}$
$12\frac{3}{4}$ (between ties)
$5\frac{3}{4}$
$24\frac{1}{4}$

OUTLINE OF WELDED GUIDE BOX FOR MODEL 'HP' DERAILS


T
G-32
3898-19
6
G-9
P
Designed throw: $5\frac{1}{2}$
Vertical Flange
7
$1\frac{3}{4}$

APPLICATION OF RAIL SHIMS WHERE REQUIRED

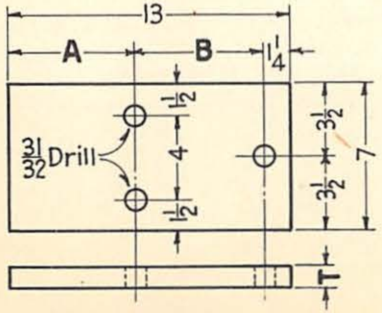
Model 'HP' Size 7 derail with 105 lb. rail shown

Provide $\frac{5}{8}$ min. diam. hole for padlocking in both positions for N.Y.C. System standard switch lock.

RAIL SHIMS (2 Required)							
ORDER NO.	WT. OF RAIL	SIZE OF DERAIL	A	B	T	P	ADZ TIE FOR DERAIL RAIL
	131 RE	7					$\frac{1}{8}$
	"	6					$1\frac{1}{8}$
	127 DUD.	7					
	"	6					1
3898-15	115 DUD.	7	$5\frac{7}{8}$	$5\frac{7}{8}$	$\frac{1}{2}$	0	
	"	6					$\frac{1}{2}$
3898-17	112 RE	7	$5\frac{7}{8}$	$5\frac{7}{8}$	$\frac{3}{8}$	0	
	"	6					$\frac{5}{8}$
3898-19	105 DUD.	7	$5\frac{7}{8}$	$5\frac{7}{8}$	1	0	
	"	6					
3898-21	100 ASCE	7	$5\frac{7}{8}$	$5\frac{7}{8}$	$1\frac{1}{4}$	$\frac{1}{4}$	
3898-22	"	6	$5\frac{7}{8}$	$5\frac{7}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	
3898-23	90 ASCE	6	$5\frac{3}{8}$	$6\frac{3}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	
	"	5					$\frac{3}{8}$
3898-25	90 DUD.	6	$5\frac{3}{8}$	$6\frac{3}{8}$	$\frac{1}{2}$	0	
	"	5					$\frac{1}{2}$

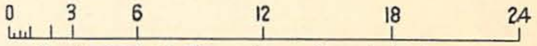
NOTES: Installation of derails: See Requisites, Plan 81.
Shims under derails not recommended.

Protective treatment shall be in accordance with Instruction 350.


13
A
B
$1\frac{1}{4}$
$1\frac{1}{2}$
4
$1\frac{1}{2}$
$3\frac{1}{2}$
$3\frac{1}{2}$
7
$\frac{31}{32}$ Drill
T

RAIL SHIMS (See Table)

SAE-1020 Steel



Scale and all dimensions given in inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

3898A
11-11-1946

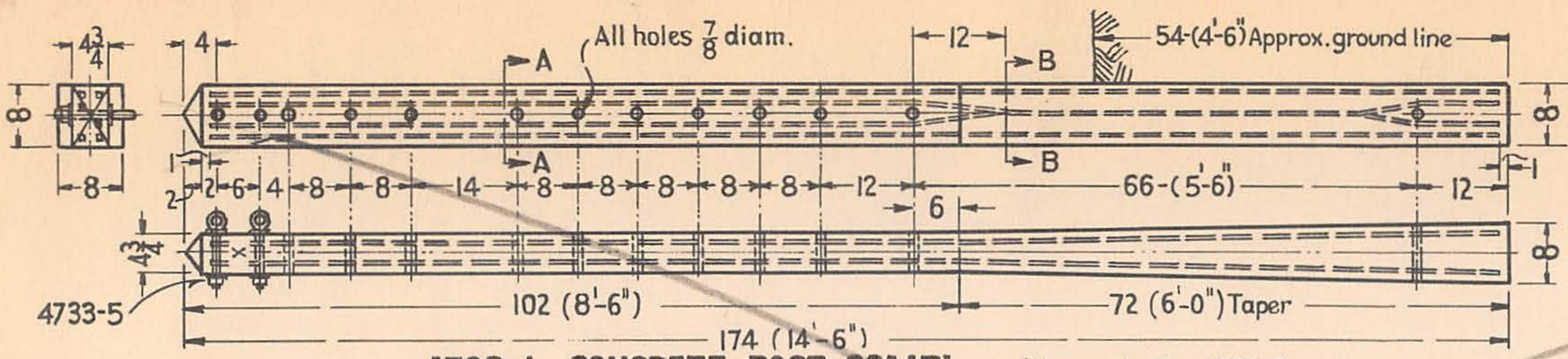
DERAILS

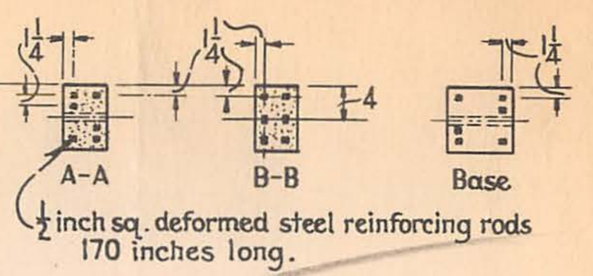
DRILLING OF WELDED GUIDE BOX FOR HAYES BLOCK-TYPE DERAILS AND RAIL SHIMS

Approved by Representatives of Lines shown.
Chairman

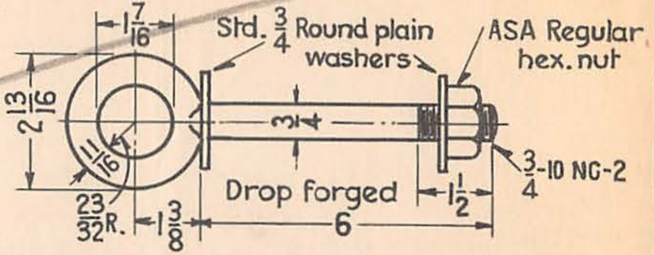
(Printed in U.S.A.)

d. 12-20-40
umbered
ue: 1 of
, was old
sue: 2 of
including
ications by
of 1-18-38.

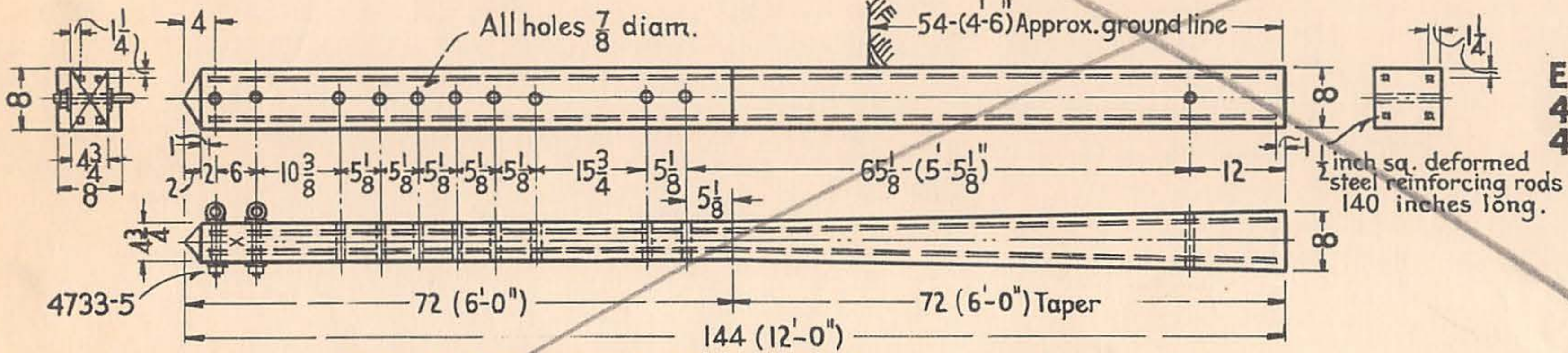

4¾
4
8
All holes ⅞ diam.
A
A
12
B
B
54-(4'-6") Approx. ground line
8
1
2
2
6
4
8
8
14
8
8
8
8
8
12
6
66-(5'-6")
12
1
4¾
4733-5
102 (8'-6")
72 (6'-0") Taper
174 (14'-6")

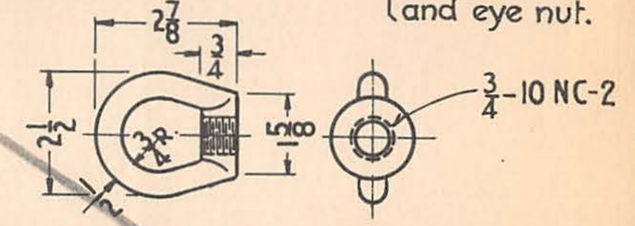

1¼
1¼
4
1¼
A-A
B-B
Base
½ inch sq. deformed steel reinforcing rods 170 inches long.

4733-1 CONCRETE POST COMPL. – with eye bolts 4733-5.
4733-2 " " " – with eye bolts 4733-6.
4733-11 " " **ONLY** – without eye bolts.


1 7/16
Std. ¾ Round plain washers
ASA Regular hex. nut
2 13/16
¾
11/16
¾-10 NC-2
23/32 R.
1⅜
Drop forged
1½
6

EYE BOLT ONLY – Buckeye No. 2075 or equal.
4733-5 EYE BOLT COMPL. – as shown.
4733-6 " " " – with washers and eye nut.

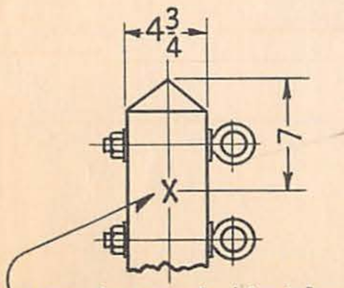

1¼
4
All holes ⅞ diam.
54-(4'-6") Approx. ground line
8
4¾
8
1
2
2
6
10⅜
5⅛
5⅛
5⅛
5⅛
5⅛
15¾
5⅛
5⅛
65⅛-(5'-5⅛")
12
1
8
1¼
½ inch sq. deformed steel reinforcing rods 140 inches long.
4¾
8
4733-5
72 (6'-0")
72 (6'-0") Taper
144 (12'-0")


2⅞
¾
2½
1⅝
¾
½
¾-10 NC-2

EYE NUT – Hubbard No. 7503 or equal.
Drop forged

4733-3 CONCRETE POST COMPL. – with eye bolts 4733-5.
4733-4 " " " – with eye bolts 4733-6.
4733-12 " " **ONLY** – without eye bolts.

Scales: ½ in. and 3 in. = 1 foot.



Manufacturer's identification to be impressed on side of post as shown.

NOTES: Posts shall be in accordance with Specification 865.

All eye bolts, nuts and washers to be galvanized.

All dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL. R.R.

4733

1 3-10-1941

CONCRETE POSTS

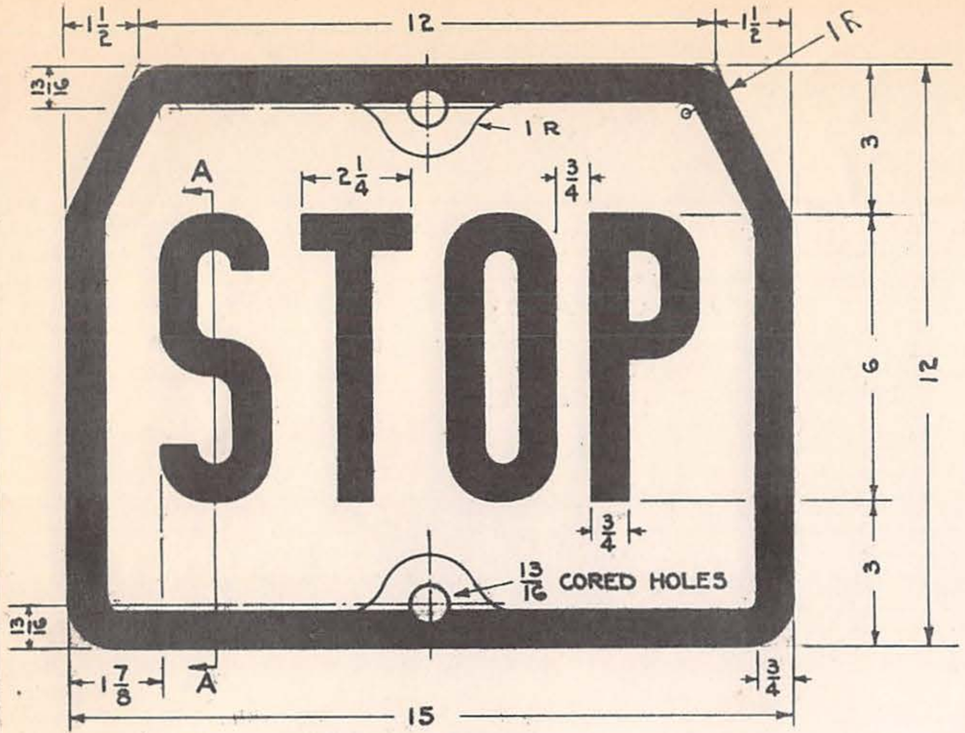
Approved by Representatives of Lines shown.

Chairman

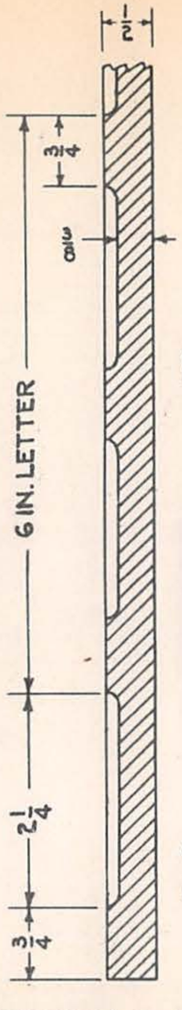
Cancelled Letter
10-13-44

4820A (6-10-1943)
SUPERSEDES NYC-W
PLAN S-53A OF
JUNE 17 1942

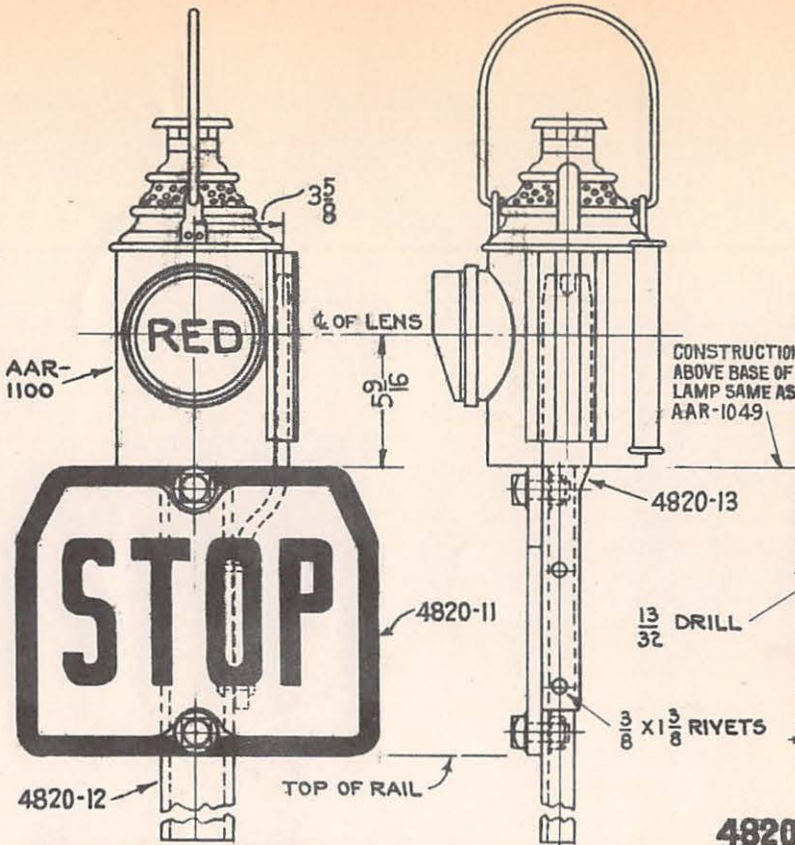
4

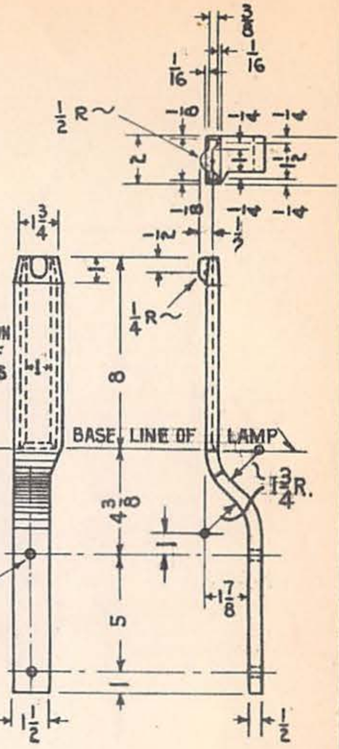

1 1/2
12
1 1/2
1 R
13/16
A
2 1/4
3/4
1 R
STOP
3
6
12
3
3/4
13/16 CORED HOLES
13/16
1 7/8
A
3/4
15

4820-11 SIGN
CAST IRON


1/2
3/4
3/8
6 IN. LETTER
2 1/4
3 1/4

SECTION A-A


3 5/8
AAR-1100
RED
℄ OF LENS
5 9/16
CONSTRUCTION ABOVE BASE OF LAMP SAME AS AAR-1049
4820-13
STOP
4820-11
3/8 x 1 3/8 RIVETS
4820-12
TOP OF RAIL

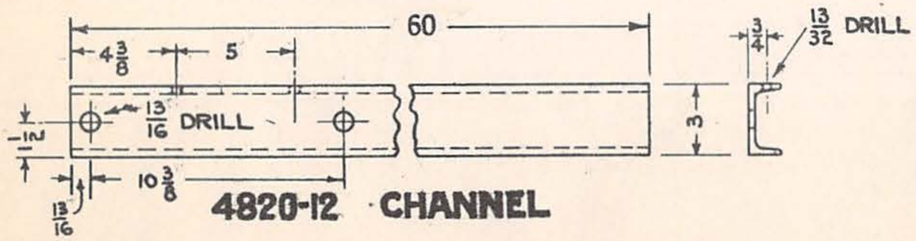

3/8
1/16
1/16
1/2 R
1 3/4
1/4 R
8
BASE LINE OF LAMP
1 3/4 R.
4 3/8
13/32 DRILL
5
1 7/8
1 1/2
1/2

4820-1 SIGN COMPL. With post, bracket and lamp.
AAR-1100 LAMP ONLY With red lens.

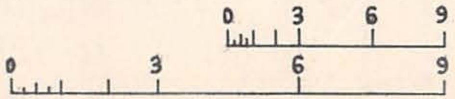
4820-13 LAMP BRACKET
M.I. OR SAE-1020 STEEL FORGED
(DEVEL. LGTH. 19 INS.)

NOTE: SIGN 4820-11 WHEN INSTALLED BETWEEN TRACKS SHALL BE MOUNTED ON CHANNEL 4820-12 WITH 2 - 3/4 X 1 3/4" SQ. HD. BOLTS AND NUTS WITH WASHERS.

SIGN 4820-11 WHEN INSTALLED OUTSIDE OF TRACKS SHALL BE MOUNTED ON CONCRETE POST WITH 2 - 3/4 X 6 1/2 SQ. HD. BOLTS AND NUTS WITH WASHERS.


60
4 3/8
5
13/16 DRILL
1 1/2
3
10 3/8
13/16
3/4
13/32 DRILL

4820-12 CHANNEL



SCALES & ALL DIMENSIONS GIVEN IN INCHES

INSTALLATION:
SIGN TO BE PLACED AT RIGHT ANGLE TO, AND TO THE RIGHT OF THE TRACK TO BE PROTECTED.

PAINTING: SIGN SHALL BE GIVEN A PRIMARY COAT OF DUTCH BOY LIQUID RED LEAD NO. 1. FACE OF SIGN SHALL THEN BE GIVEN 2 COATS OF RED PAINT. LETTERS, MARGIN, CHANNEL, LAMP BRACKET AND BACK OF SIGN SHALL THEN BE GIVEN A FINISHING COAT OF WHITE PAINT.

NOTE: PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH INSTRUCTION 350.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

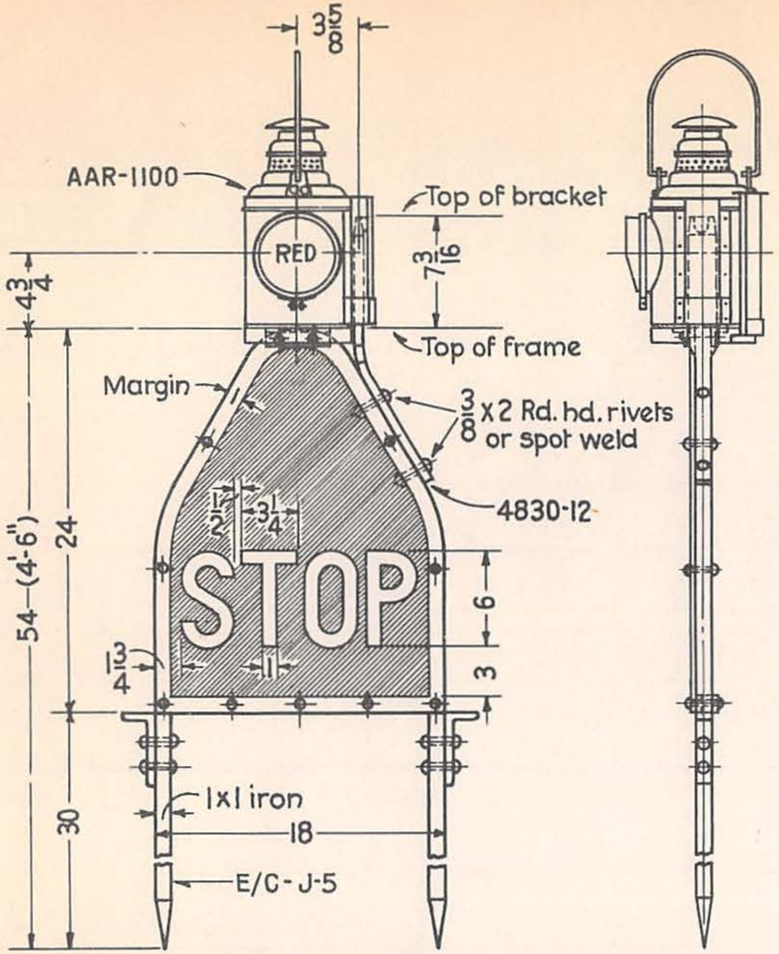
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

4820A
6-10-1943

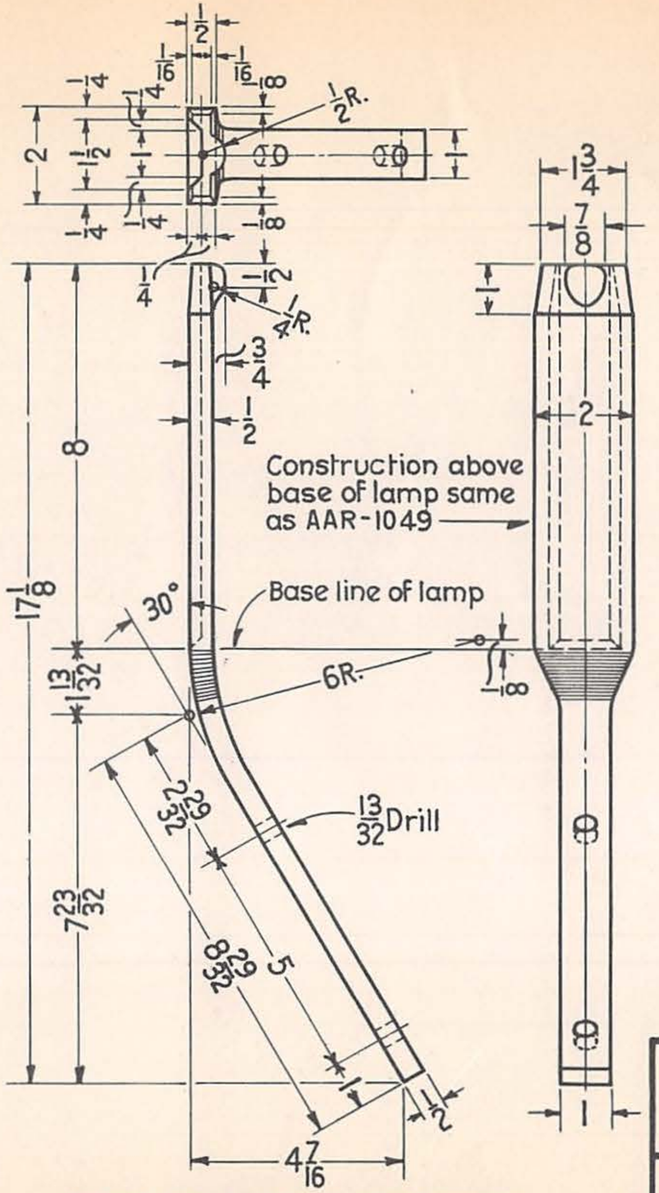
PERMANENT STOP SIGN

Approved by Representatives of Lines shown.
Chairman

4830A (6-10-43)
Supersedes NYC-W
S-S3B and S-T31A
of June 17' 1942


3 5/8
AAR-1100
Top of bracket
7 3/16
RED
4 3/4
Top of frame
Margin
3/8 X 2 Rd. hd. rivets or spot weld
4830-12
1/2
3/4
STOP
6
3
1
1 3/4
54-(4'-6")
24
30
1x1 iron
18
E/C-J-5

4830-1 STOP SIGN COMPL.—With lamp and bracket
4830-11 " " ONLY—With lamp bracket
AAR-1100 LAMP ONLY—With red lens
Frame, for dimensions see E.C. Plan J-5, Fig. 256


1/2
1/16
1/16
1/8
1/2R.
1/4
1/4
2
1 1/2
1/4
1/8
1/4
1/4
1/2
1/4R.
3/4
1/2
8
Construction above base of lamp same as AAR-1049
17 1/8
30°
Base line of lamp
1 13/32
6R.
1/8
13/32 Drill
2 29/32
8 29/32
5
7 23/32
1
1/2
4 7/16
1 3/4
7/8
2
1

4830-12 LAMP BRACKET
Mal. iron or SAE-1020 steel forged
(Devel. lgth. 18 5/16 in.)

INSTALLATION:

Sign to be placed at right angle to, and to the right of the track to be protected.

When used between tracks the center line of lens shall be not more than 17 inches above top of rail.

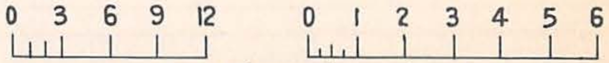
PAINTING:

Sign shall be given a priming coat of Dutch Boy Liquid Red Lead No. 1.

Face of sign shall then be given 2 coats of red paint.

Letters, Margin, Frame, Lamp bracket and back of sign shall then be given a finishing coat of White Paint.

Protective treatment shall be in accordance with Instruction 350.


0 3 6 9 12
0 1 2 3 4 5 6

Scales and all dimensions given in inches

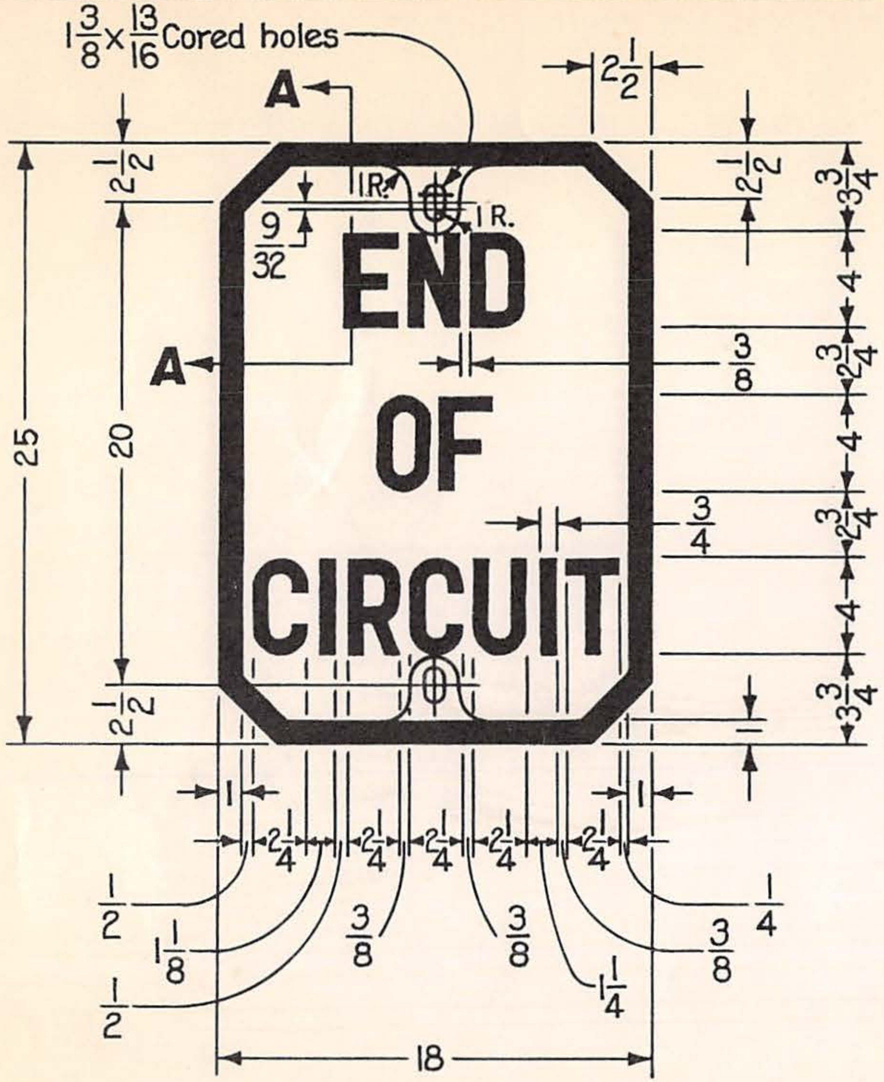
NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.Ry.
B.& A.R.R.
P. & L.E.R.R.

4830A
6-10-1943

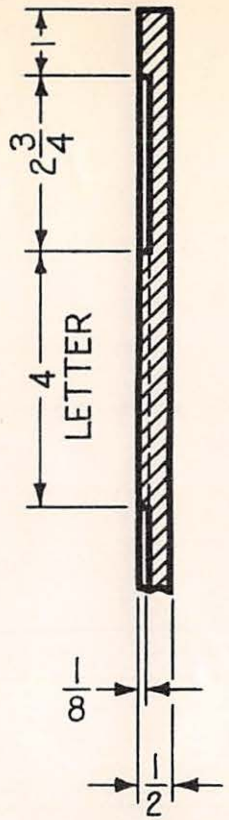
TEMPORARY STOP SIGN

Approved by Representatives of Lines shown.
Chairman



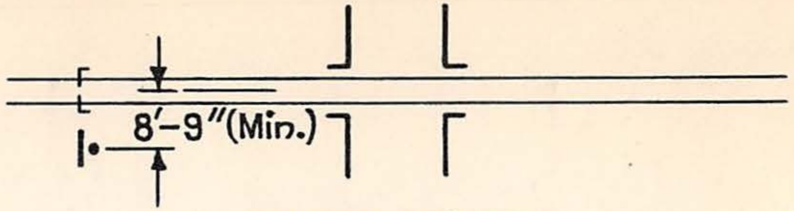
1 3/8 x 13/16 Cored holes
A
A
2 1/2
2 1/2
2 1/2
1 R.
1 R.
9/32
END
OF
CIRCUIT
25
20
3/8
3/4
3 3/4
4
2 3/4
4
2 3/4
4
3 3/4
2 1/2
1
1
2 1/4
2 1/4
2 1/4
2 1/4
2 1/4
1/2
1 1/8
1/2
3/8
3/8
1 1/4
3/8
1/4
18

4841-1 SIGN
Cast iron
Scale: 1½ in.=1 Ft.



2 3/4
4 LETTER
1/8
1/2

SECTION A-A
Scale: 4 in.=1 Ft.



TYPICAL LOCATION

NOTES:

1. All dimensions given in inches.
2. Signs shall be placed at right angles to track.
3. Painting shall be in accordance with Instructions 350, and as follows—

   Priming coat: Entire sign.

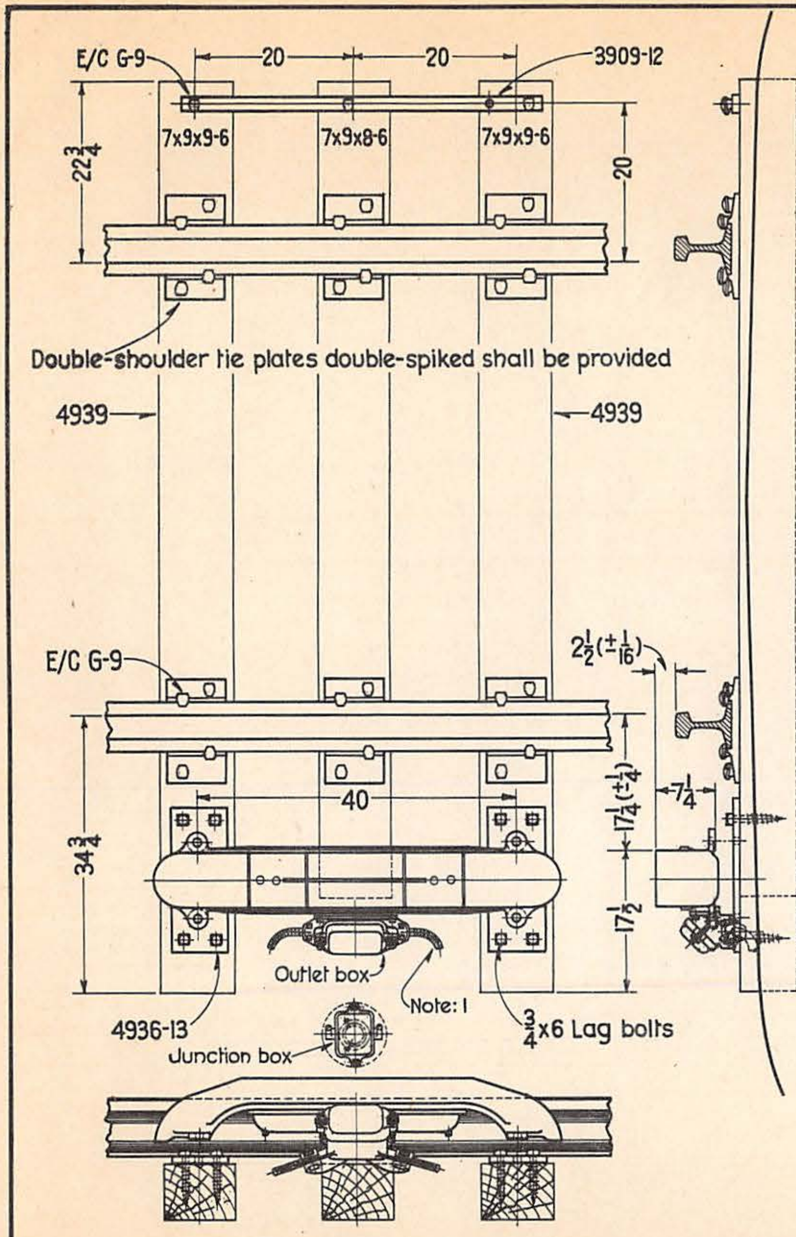
   Finish coat: Front of sign—2 coats of Chrome Yellow enamel. Back of sign, border and Letters—One coat of black.

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**	N.Y.C.R.R. M.C.R.R. C.C.C.&ST.L.RY. B.&A.R.R. P.&L.E.R.R.	**4841B** 7-19-1948 11-12-1952
SIGN FOR MARKING END OF TRACK CIRCUIT	Approved by Representatives of lines shown. Chairman.	

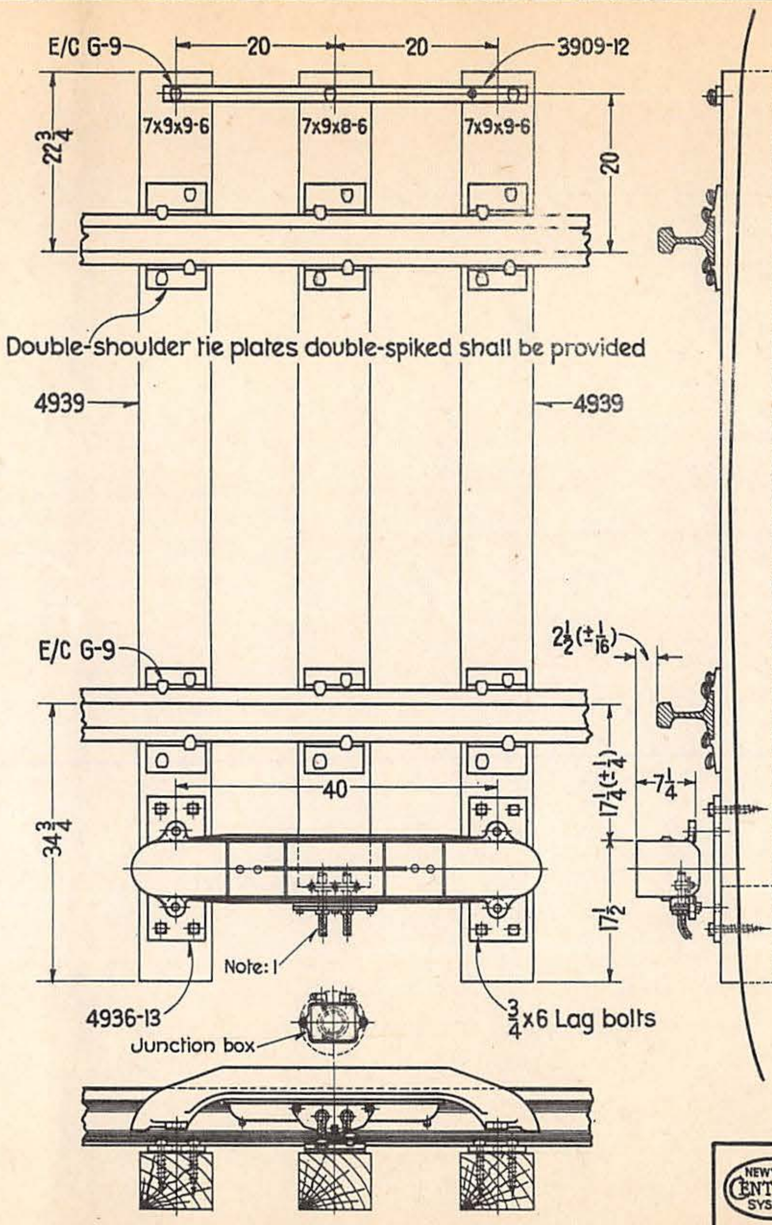
Printed in U.S.A.

RECEIVED
APR 3 1953
ORD. INTER. SECT.

Plan 4930A (8-10-1942)
Supersedes N.Y. C.R.R.-W.
Plan S-U5A (1-22-1937)


E/C G-9
20
20
3909-12
$22\frac{3}{4}$
7x9x9-6
7x9x8-6
7x9x9-6
20
Double-shoulder tie plates double-spiked shall be provided
4939
4939
$2\frac{1}{2}(\pm\frac{1}{16})$
E/C G-9
40
$7\frac{1}{4}$
$34\frac{3}{4}$
$17\frac{1}{4}(\pm\frac{1}{4})$
$17\frac{1}{2}$
Outlet box
Note: I
4936-13
$\frac{3}{4}$x6 Lag bolts
Junction box

LAYOUT — A


E/C G-9
20
20
3909-12
$22\frac{3}{4}$
7x9x9-6
7x9x8-6
7x9x9-6
20
Double-shoulder tie plates double-spiked shall be provided
4939
4939
$2\frac{1}{2}(\pm\frac{1}{16})$
E/C G-9
40
$7\frac{1}{4}$
$34\frac{3}{4}$
$17\frac{1}{4}(\pm\frac{1}{4})$
$17\frac{1}{2}$
Note: I
4936-13
$\frac{3}{4}$x6 Lag bolts
Junction box

LAYOUT — B

NOTES:

1. Single conductor No. 8 A.W.G., 19 strand trench cable - N.Y. C.S. Spec. 376.
2. See 4935 - Inductor fastenings - Assemblies.
3. See 4936 - " " - Details.
4. See 4937 - " cable entrance covers.
5. See 4939 - " ties.
6. Protective treatment, except ties, shall be in accordance with Instruction 350.
7. This plan does not apply between Poughkeepsie and New York.

0
3
6
9
12
24
36

Scale & all dimensions given in inches

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R.

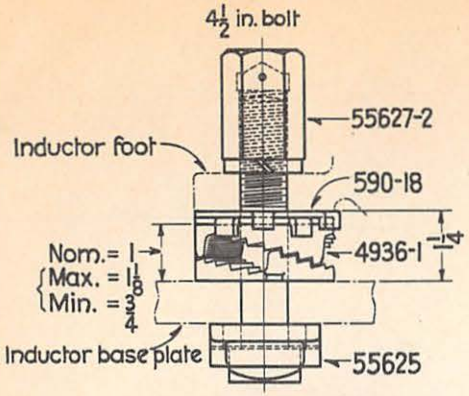
4930A
8-10-1942

INDUCTOR LAYOUT

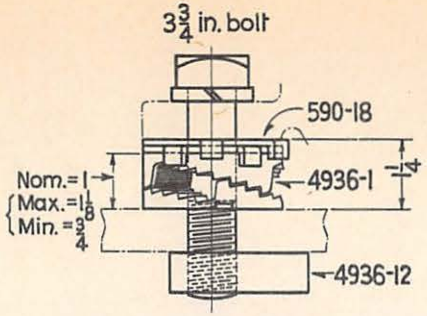
AUTOMATIC TRAIN STOP

Approved by Representatives of Lines shown.

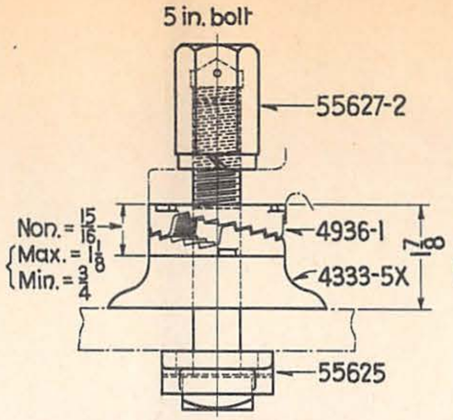
Chairman


4½ in. bolt
55627-2
Inductor foot
590-18
Nom.= 1
Max. = 1⅛
Min. = ¾
4936-1
1¼
Inductor base plate
55625

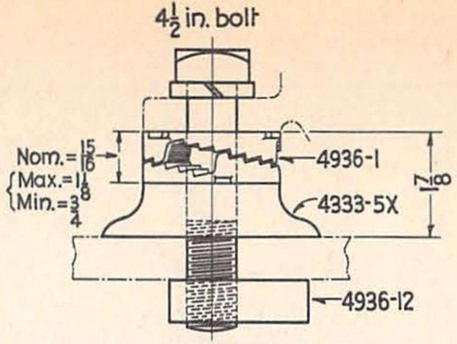
4935-1 ASSEMBLY
FOR 105 LB. RAIL


3¾ in. bolt
590-18
Nom.= 1
Max.= 1⅛
Min.= ¾
4936-1
1¼
4936-12

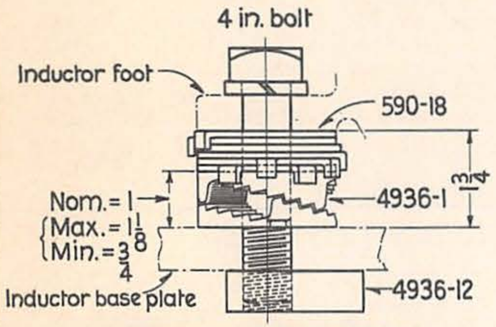
4935-2 ASSEMBLY
FOR 105 LB. RAIL


5 in. bolt
55627-2
Nom.= 15/16
Max.= 1⅛
Min.= ¾
4936-1
1⅞
4333-5X
55625

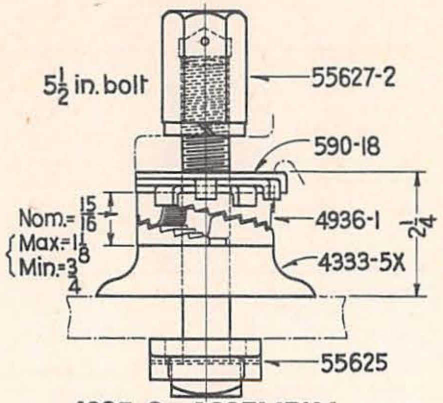
4935-3 ASSEMBLY
FOR 112 LB. RAIL


4½ in. bolt
Nom.= 15/16
Max.= 1⅛
Min.= ¾
4936-1
1⅞
4333-5X
4936-12

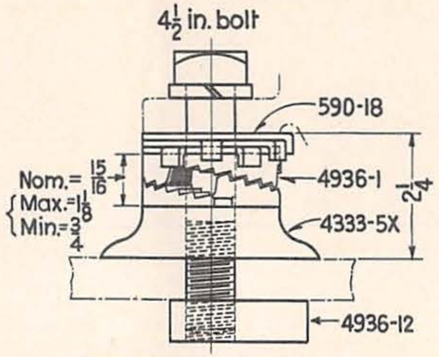
4935-4 ASSEMBLY
FOR 112 LB. RAIL


4 in. bolt
Inductor foot
590-18
1¾
Nom.= 1
Max.= 1⅛
Min.= ¾
4936-1
Inductor base plate
4936-12

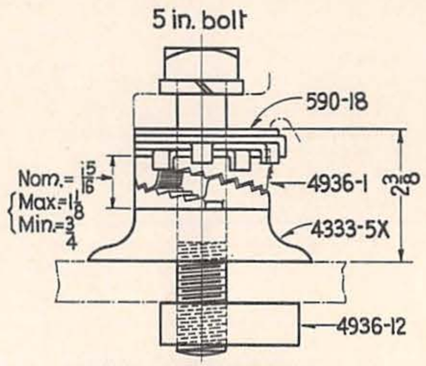
4935-5 ASSEMBLY
FOR 115 LB. RAIL


5½ in. bolt
55627-2
590-18
Nom.= 15/16
Max.= 1⅛
Min.= ¾
4936-1
2¼
4333-5X
55625

4935-6 ASSEMBLY
FOR 127 LB. RAIL


4½ in. bolt
590-18
Nom.= 15/16
Max.= 1⅛
Min.= ¾
4936-1
2¼
4333-5X
4936-12

4935-7 ASSEMBLY
FOR 127 LB. RAIL


5 in. bolt
590-18
Nom.= 15/16
Max.= 1⅛
Min.= ¾
4936-1
2⅜
4333-5X
4936-12

4935-8 ASSEMBLY
FOR 131 LB. RAIL

RAIL		BOLT ASSEMBLY COMPLETE		SPECIAL HEX. GREASE NUT	STRAP NUT	SPECIAL 'U' WASHER	CAST IRON WASHER	ANCHOR WASHER	ADJUSTER COMPL.	SPRING WASHER
WT.	HIGH	ORDER NO.	REG. SQ. HD. BOLT	GRS 55627-2	4936-12	GRS 590-18	GRS 4333-5X	GRS 55625	4936-1	¼ x ¼ x ⅞
105	6	**4935-1**	⅞-9NC-2 x 4½	1	0	2	0	1	1	1
105	6	**4935-2**	⅞-9NC-2 x 3¾	0	1	2	0	0	1	1
112	6⅝	**4935-3**	⅞-9NC-2 x 5	1	0	0	1	1	1	1
112	6⅝	**4935-4**	⅞-9NC-2 x 4½	0	1	0	1	0	1	1
115	6½	**4935-5**	⅞-9NC-2 x 4	0	1	6	0	0	1	1
127	7	**4935-6**	⅞-9NC-2 x 5½	1	0	3	1	1	1	1
127	7	**4935-7**	⅞-9NC-2 x 4½	0	1	3	1	0	1	1
131	7⅛	**4935-8**	⅞-9NC-2 x 5	0	1	4	1	0	1	1

NOTES:

Where excessive corrosion is experianced use Assemblies 4935-1, 4935-3 and 4935-6.

All bolts to be unfinished ASA Regular Square Head - SAE 1020 Steel.

Protective treatment shall be in accordance with Instruction 350.

0 1 2 3 4 5 6

Scale & all dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

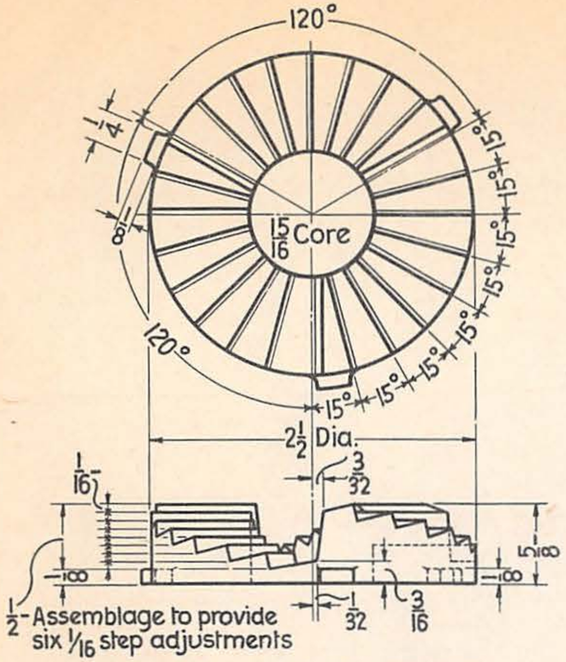
INDUCTOR FASTENINGS ASSEMBLIES
AUTOMATIC TRAIN STOP

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

4935A
8-10-1942

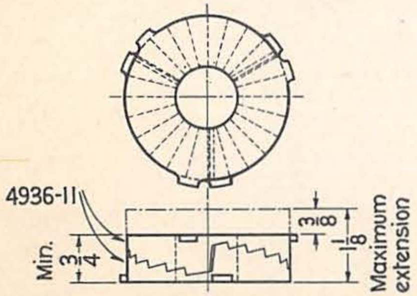
Approved by Representatives of Lines shown.
Chairman

4936A (8-10-1942)
Supersedes N.Y.C.
Plans S-U5B and
S-U5C.



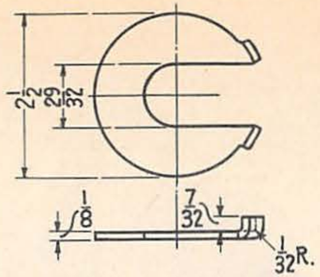
120°
120°
1/4
1/8
15°
15/16 Core
2 1/2 Dia.
1/16
3/32
5/8
1/8
1/8
1/32
3/16
1/2-Assemblage to provide six 1/16 step adjustments

4936-11 HALF ADJUSTER
Mall. iron



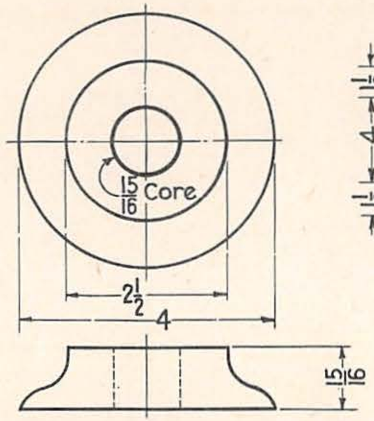
4936-11
Min. 3/4
3/8
1 1/8
Maximum extension

4936-1 ADJUSTER COMPL.



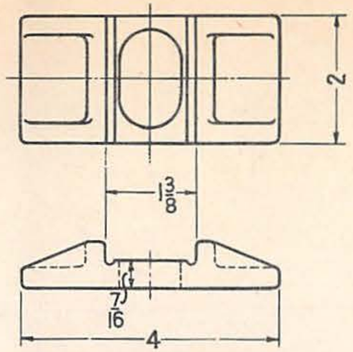
2 1/2
29/32
1/8
7/32
1/32 R.

SPECIAL 'U' WASHER
G.R.S. No. 590-18 or equal
No. 11 U.S.S.G. sh. steel

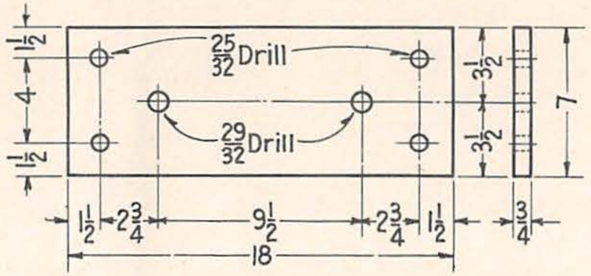


15/16 Core
2 1/2
4
15/16

WASHER
G.R.S. No. 4333-5X or equal
Cast iron

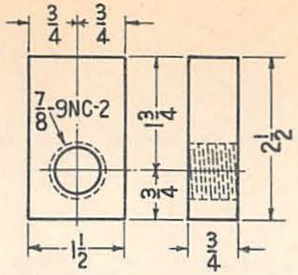


ANCHOR WASHER
G.R.S. No. 55625 or equal
Cast steel



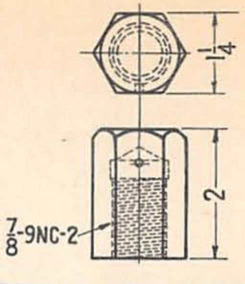
25/32 Drill
29/32 Drill
1 1/2
4
1 1/2
3 1/2
3 1/2
7
1 1/2
2 3/4
9 1/2
2 3/4
1 1/2
18
3/4

4936-13 INDUCTOR BASE PLATE
SAE-1020 Steel



3/4
3/4
7/8-9NC-2
1 3/4
3/4
2 1/2
1 1/2
3/4

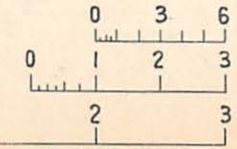
4936-12 STRAP NUT
SAE-1020 Steel



1 1/4
7/8-9NC-2
2

SPECIAL HEX. GREASE NUT
G.R.S. No. 55627-2 or equal
SAE-1112 C.D. Steel-Cadmium plated

NOTE: Protective treatment shall be in accordance with Instruction 350.



0
3
6
0
1
2
3
0
1
2
3

Scales & all dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

INDUCTOR FASTENINGS
DETAILS
AUTOMATIC TRAIN STOP

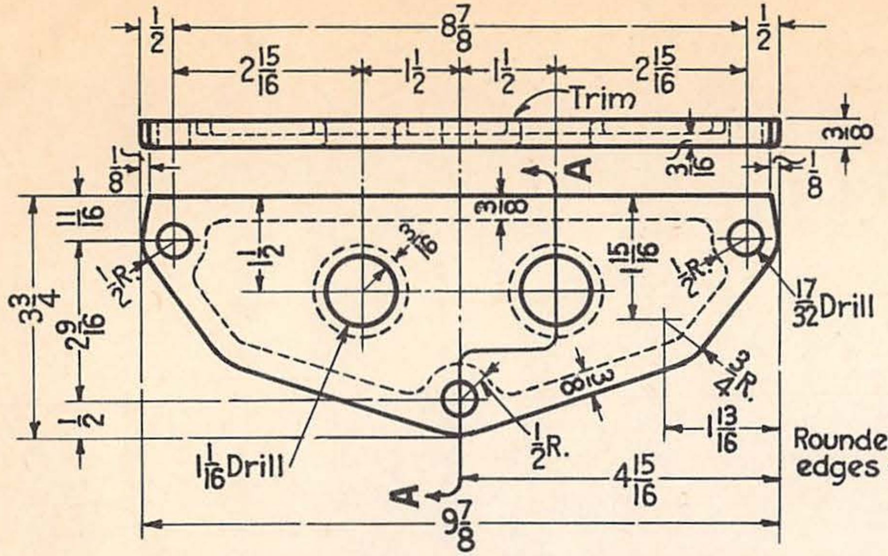
N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

4936A
8-10-1942

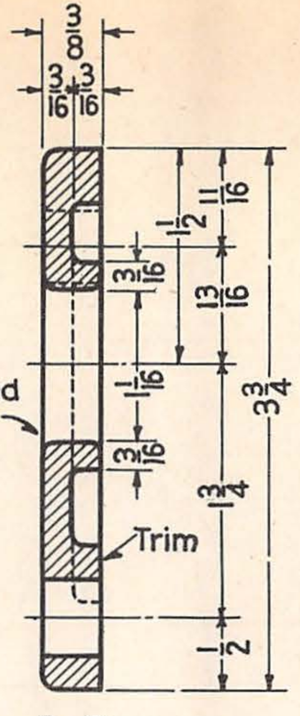
Approved by Representatives of Lines shown.

Chairman

4937A (8-10-1942)
Cancels N.Y.C. plan
S-U5B Rev. 1



1/2
8 7/8
1/2
2 15/16
1 1/2
1 1/2
2 15/16
Trim
3/8
3/16
1/8
1/8
A
A
3/8
3 3/4
11/16
2 9/16
1/2
3/16
1 15/16
1/2 R.
1/2 R.
17/32 Drill
3/8
3/8
3/4 R.
1/2 R.
1/2
1 1/16 Drill
1 13/16
4 15/16
9 7/8

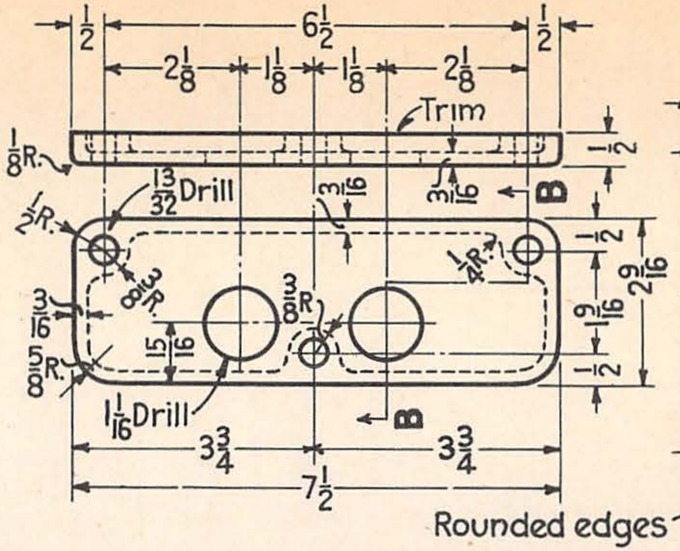


3/8
3/16
3/16
11/16
1 1/2
3/16
13/16
1 1/16
3 3/4
3/16
1 3/4
Trim
Rounded edges
1/2

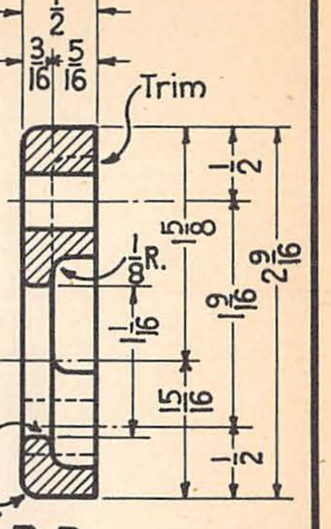
A-A

INDUCTOR CABLE ENTRANCE COVER

G.R.S. No. 49375-15 or equal
Cast brass



1/2
6 1/2
1/2
2 1/8
1 1/8
1 1/8
2 1/8
Trim
1/8 R.
1/2
13/32 Drill
3/16
3/16
B
B
1/2 R.
1/2
2 9/16
3/16
3/8 R.
3/8 R.
1/4 R.
9/16
3/16
15/16
5/8 R.
1/2
1 1/16 Drill
3 3/4
3 3/4
7 1/2



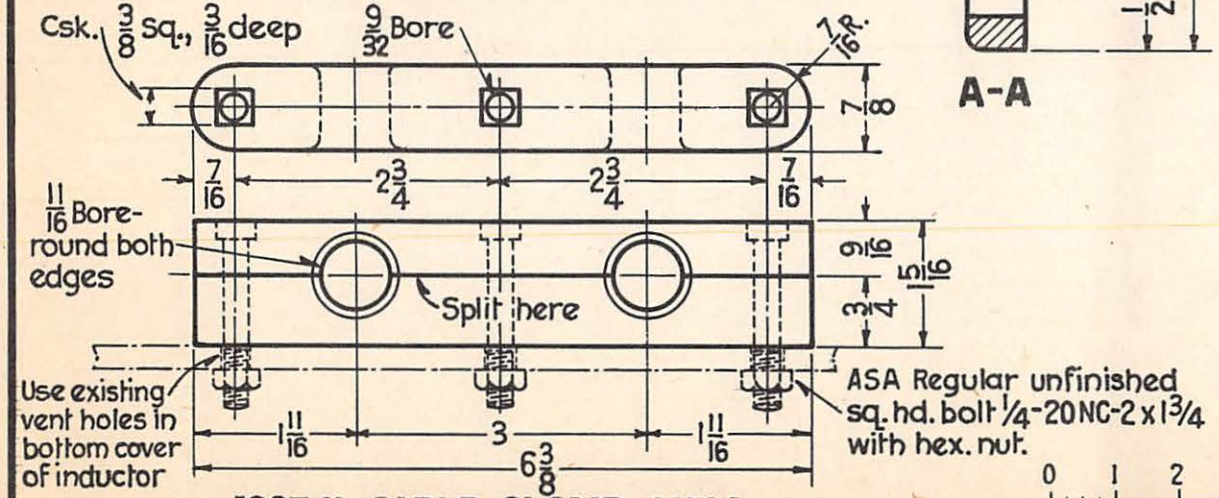
1/2
3/16
5/16
Trim
1/2
1 5/8
2 9/16
1/8 R.
1/16
1 9/16
15/16
1/2
Rounded edges
1/8 R.

B-B

INDUCTOR CABLE ENTRANCE COVER

U.S. & S., Pc. No. 222895 or equal
Cast brass

NOTE:
Protective treatment shall be in accordance with Instruction 350.



Csk. 3/8 sq., 3/16 deep
9/32 Bore
7/16 R.
7/8
7/16
2 3/4
2 3/4
7/16
11/16 Bore-round both edges
9/16
1 5/16
3/4
Split here
Use existing vent holes in bottom cover of inductor
ASA Regular unfinished sq. hd. bolt 1/4-20NC-2 x 1 3/4 with hex. nut.
1 11/16
3
1 11/16
6 3/8

4937-11 CABLE CLAMP ONLY
4937-1 " " COMPL. - With bolts.
Hardwood - Immerse in hot linseed oil.

0 1 2 3 4 5 6
0 1 2 3 4

Scales & all dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

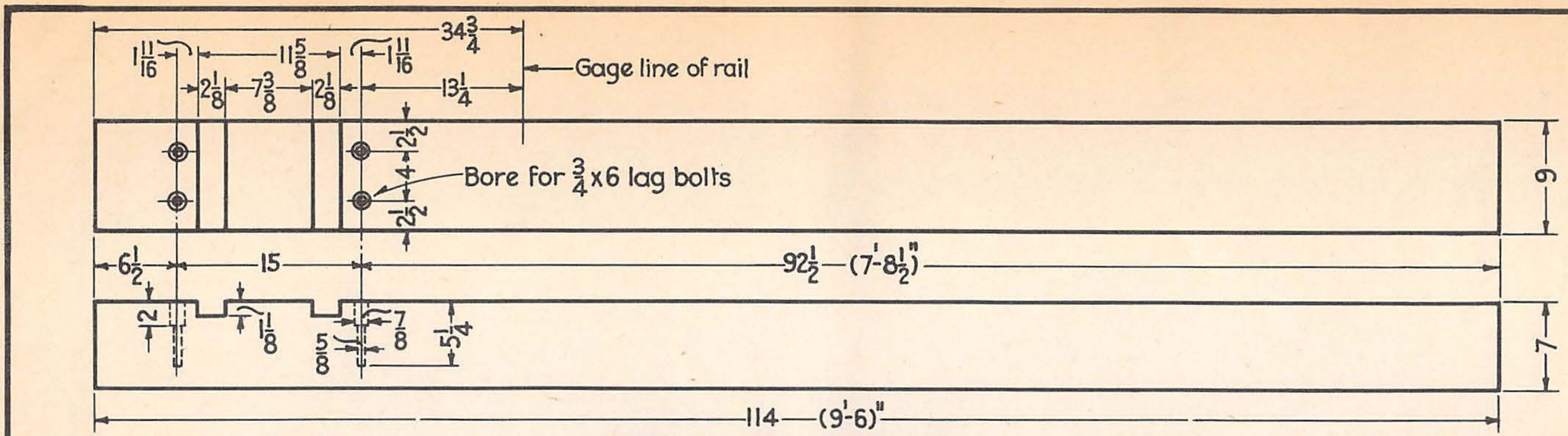
N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUT.L.R.R.

4937A
8-10-1942

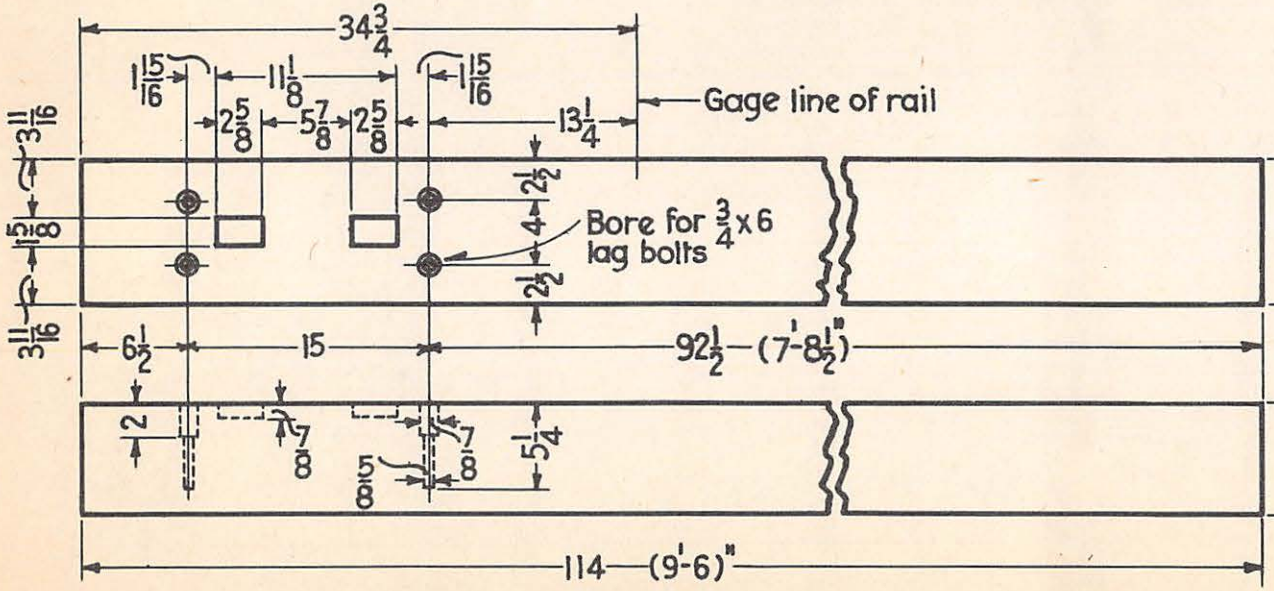
INDUCTOR CABLE ENTRANCE COVERS AND CABLE CLAMP

AUTOMATIC TRAIN STOP

Approved by Representatives of Lines shown.
J. Keenan
Chairman


34 3/4
1 11/16
11 5/8
1 11/16
Gage line of rail
2 1/8
7 3/8
2 1/8
13 1/4
2 1/2
4
2 1/2
Bore for 3/4 x 6 lag bolts
9
6 1/2
15
92 1/2 — (7'-8 1/2")
2
1 1/8
5/8
7/8
5 1/4
7
114 — (9'-6)"

4939-11 INDUCTOR TIE


34 3/4
1 15/16
11 1/8
1 15/16
Gage line of rail
2 5/8
5 7/8
2 5/8
13 1/4
3 11/16
1 5/8
3 11/16
2 1/2
4
2 1/2
Bore for 3/4 x 6 lag bolts
9
6 1/2
15
92 1/2 — (7'-8 1/2")
2
7/8
5/8
7/8
5 1/4
7
114 — (9'-6)"

4939-12 INDUCTOR TIE

NOTE:

Ties to be oak and creosoted after framing.

0 3 6 9 12 24 36

Scale & all dimensions given in inches

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

4939A

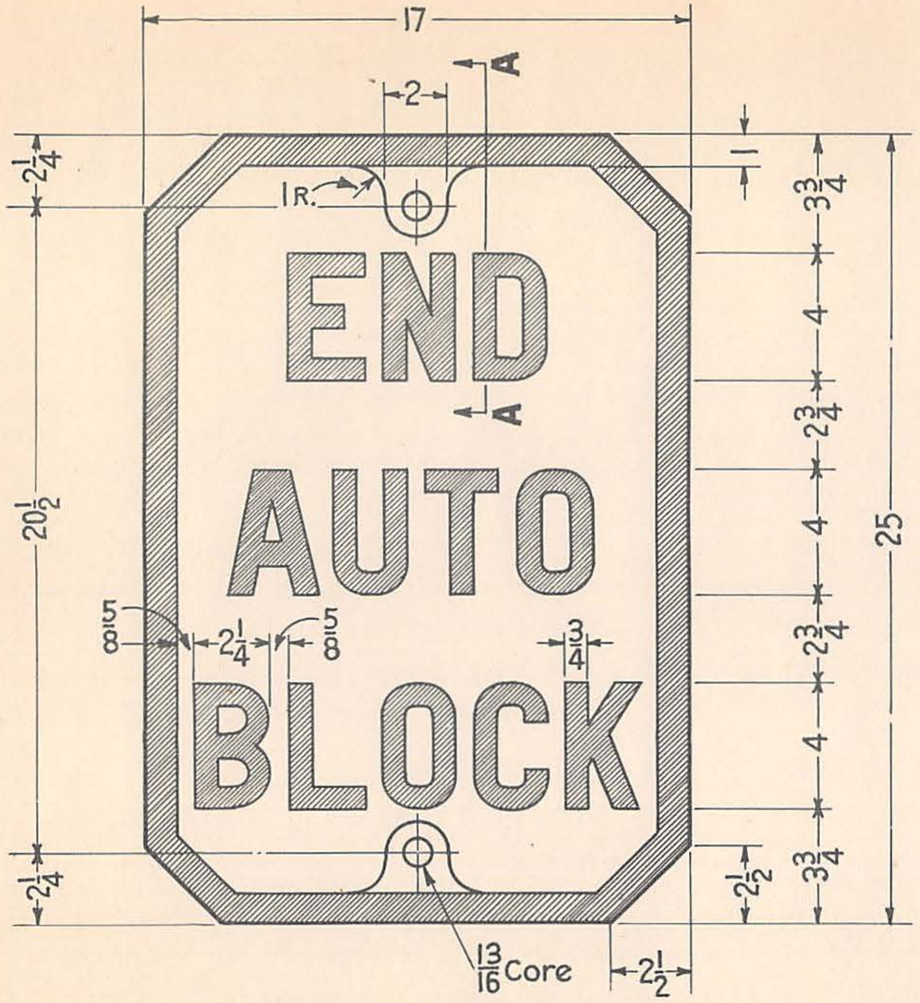
8-10-1942

INDUCTOR TIES

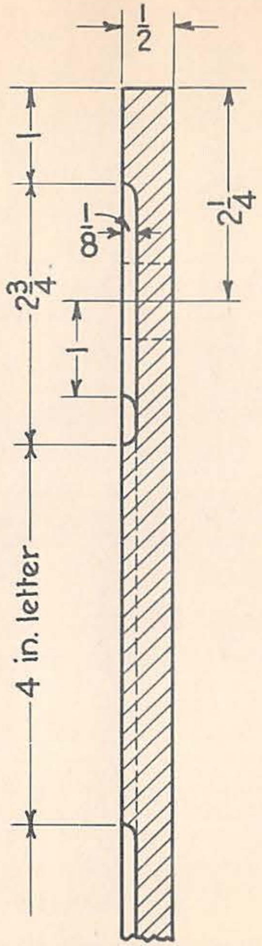
AUTOMATIC TRAIN STOP

Approved by Representatives of Lines shown.

J J Corcoran
Chairman


17
2
A
1R.
1
3 3/4
2 1/4
END
AUTO
BLOCK
4
2 3/4
4
2 3/4
4
3 3/4
25
20 1/2
2 1/4
5/8
2 1/4
5/8
3/4
2 1/2
13/16 Core
2 1/2

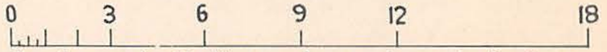
4840-11 SIGN—Cast iron


1/2
1
1/8
2 1/4
2 3/4
1
4 in. letter

SECTION–AA

PAINTING: Sign shall be given a priming coat of red lead with 2 succeeding coats of chrome yellow enamel, N.Y.C.S., Spec. 1216. Margin, letters and back of sign shall then be given a finishing coat of Formula 'F' paint.

NOTE: Protective treatment shall be in accordance with Instruction 350.



Scale and all dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

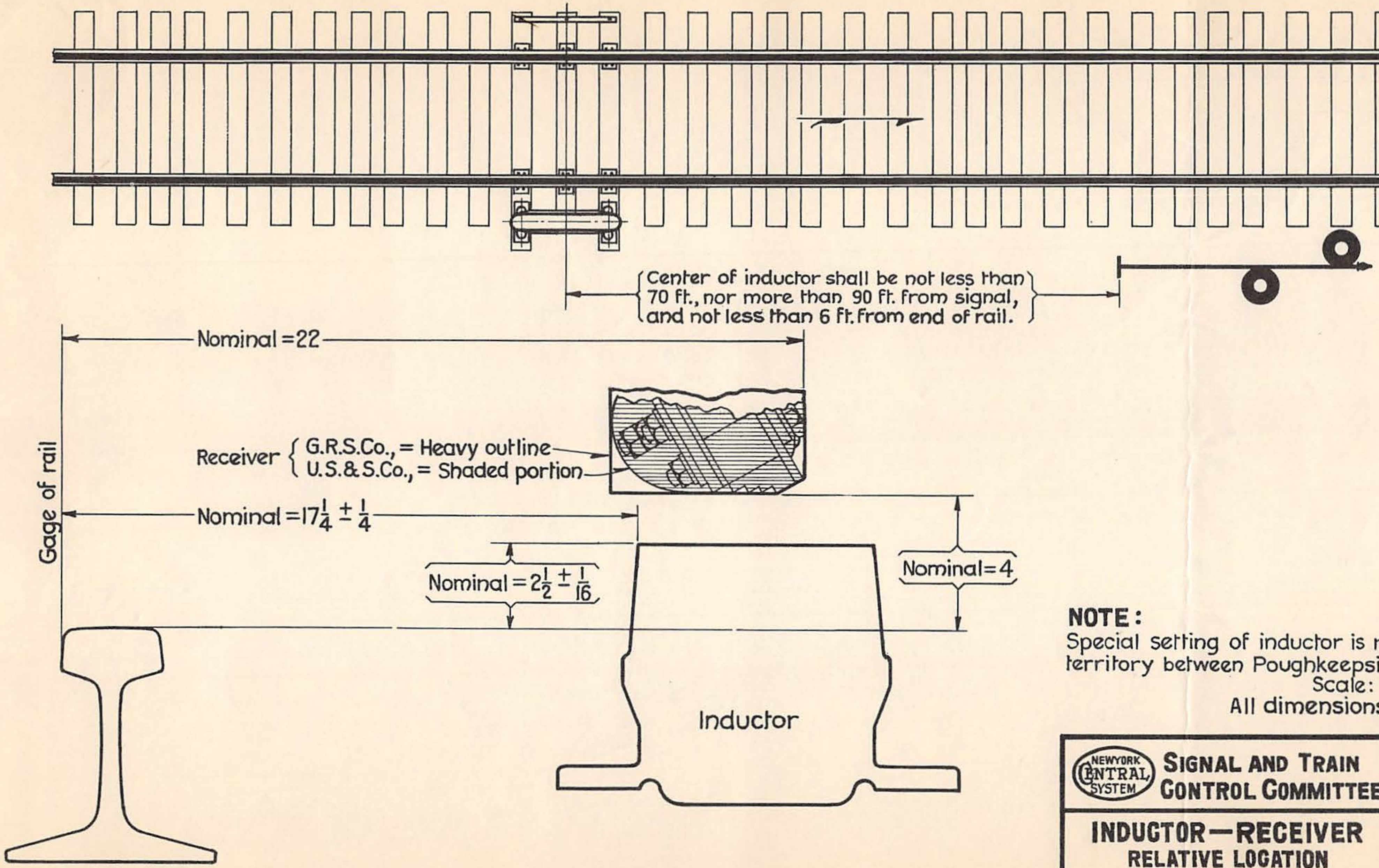
4840A
9-18-1945

SIGN

FOR MARKING
END AUTOMATIC BLOCK

Approved by Representatives of Lines shown.

J.J. Corcoran
Chairman


Center of inductor shall be not less than 70 ft., nor more than 90 ft. from signal, and not less than 6 ft. from end of rail.
Nominal = 22
Receiver { G.R.S.Co., = Heavy outline
U.S.& S.Co., = Shaded portion
Gage of rail
Nominal = 17¼ ± ¼
Nominal = 2½ ± 1/16
Nominal = 4
Inductor

NOTE:
Special setting of inductor is required for territory between Poughkeepsie and New York.

Scale: 3 in. = 1 ft.
All dimensions given in inches.

Plan rev'd 11-9-39
and renumbered
4941 Issue: 1, was
old No. 9004 Issue:
2 of 6-24-1931

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

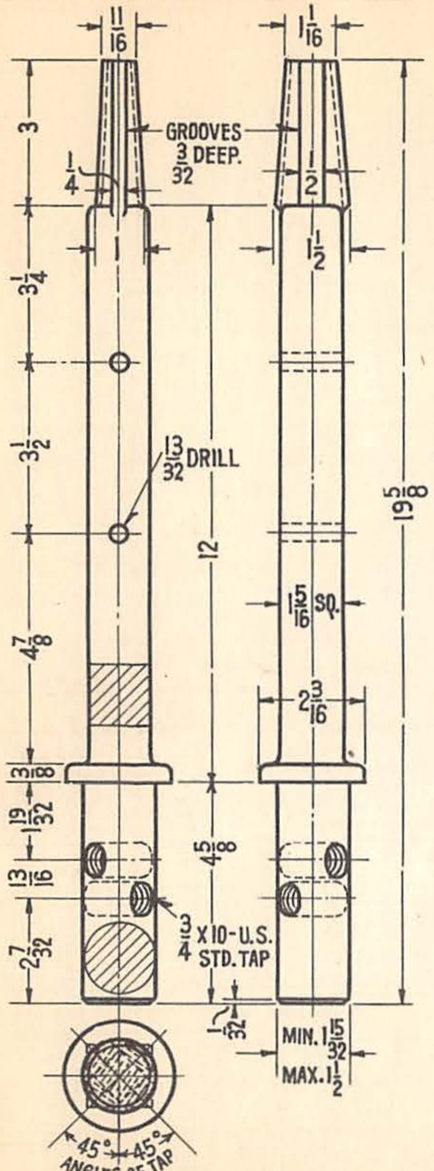
INDUCTOR—RECEIVER
RELATIVE LOCATION
AUTOMATIC TRAIN STOP

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

4941

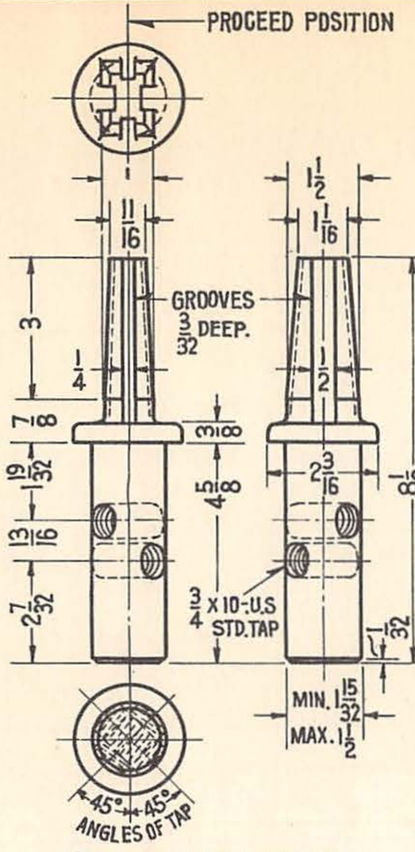
1	1-20-1940
2	7-9-1941

Approved by Representatives of Lines shown.
J. M. Corcoran
Chairman



11/16
1 1/16
GROOVES 3/32 DEEP.
3
1/4
1/2
1 1/2
3 1/4
3 1/2
13/32 DRILL
12
19 5/8
1 5/16 SQ.
4 7/8
2 3/16
3/8
19/32
4 5/8
13/16
3/4 X 10-U.S. STD. TAP
2 7/32
1/32
MIN. 1 15/32
MAX. 1 1/2
45° 45°
ANGLES OF TAP

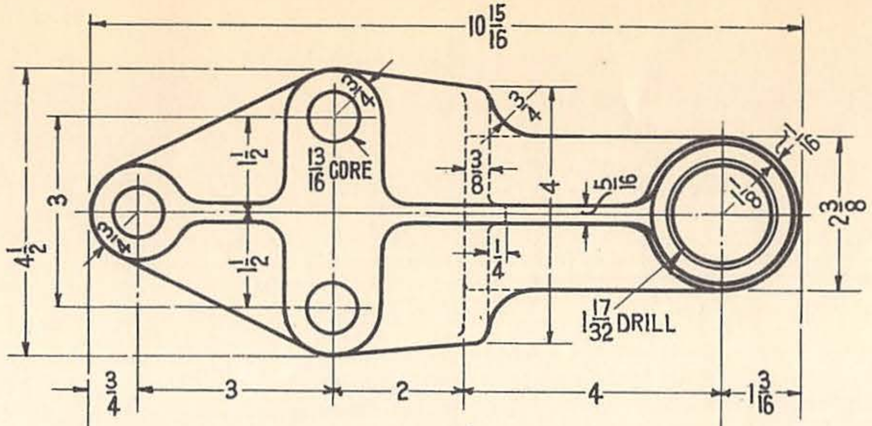
4951-5 HIGH STAFF
CAST IRON



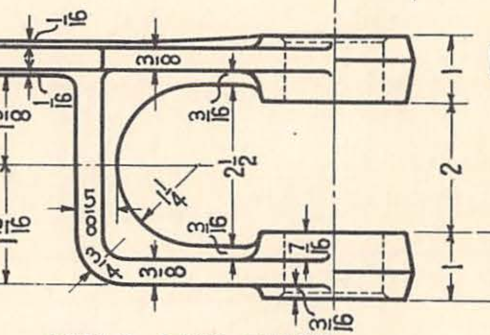
PROCEED POSITION
11/16
GROOVES 3/32 DEEP.
1 1/2
1 1/16
3
1/4
1/2
7/8
3/8
19/32
4 5/8
2 3/16
8 1/2
13/16
3/4 X 10-U.S STD. TAP
2 7/32
1/32
MIN. 1 15/32
MAX. 1 1/2
45° 45°
ANGLES OF TAP

4951-4 LOW STAFF
CAST IRON

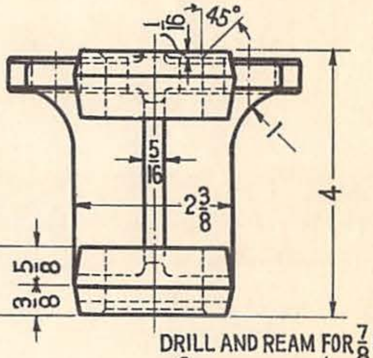
0 3 6



10 15/16
3/4
13/16 CORE
1 1/2
1 1/2
3/8
4
5/16
1/16
1 1/8
1 1/4
3
4 1/2
2 3/8
1 17/32 DRILL
3/4
3
2
4
1 3/16

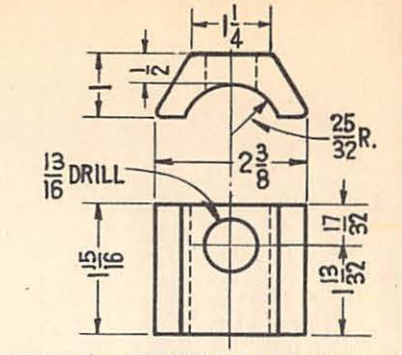


1/16
1/2
3/8
1/16
3 1/8
3/16
2 1/2
1/4
3/16
2
1
1
1 3/16
5/8
3/4
3/8
7/16
3/16
0 3 6



1/16
45°
1
5/16
2 3/8
4
5/8
3/8

4951-1 LOW STAND
MALL. IRON



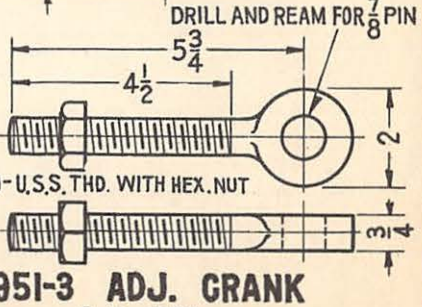
1 1/4
1/2
25/32 R.
13/16 DRILL
2 3/8
1 5/16
17/32
1 13/32

4951-2 CONCAVE WASHER
CAST IRON

NOTES: Scales and dimensions given in inches.

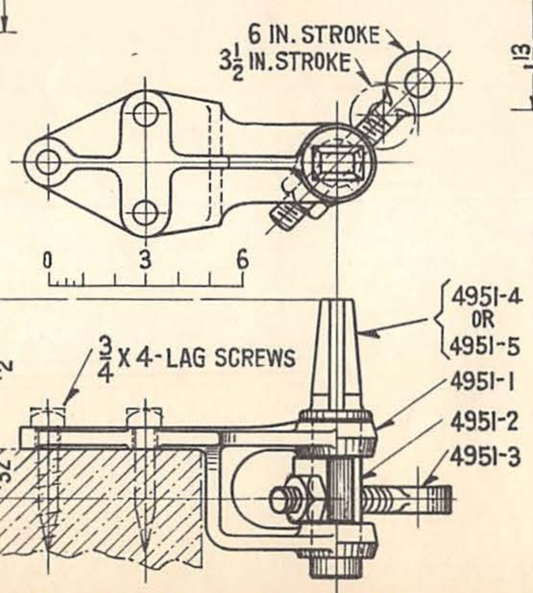
When ordering parts give number and name in large type.

Design same as A.R.A. 1399 except staff bearing fit.



DRILL AND REAM FOR 7/8 PIN
5 3/4
4 1/2
2
3/4 X 10-U.S.S. THD. WITH HEX. NUT
3/4

4951-3 ADJ. CRANK
O. H. STEEL



6 IN. STROKE
3 1/2 IN. STROKE
0 3 6
4 1/2
3/4 X 4-LAG SCREWS
4951-4 OR 4951-5
4951-1
4951-2
4951-3
1 25/32

4951-6 LOW TARGET STAND COMPL. -WITH LOW STAFF 4951-4
4951-7 " " " " -WITH HIGH STAFF 4951-5

NEW YORK CENTRAL LINES
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
B.&A.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
P.&L.E.R.R.
RUTLAND R.R.
N.Y.&R.R.(OCL.).

4951

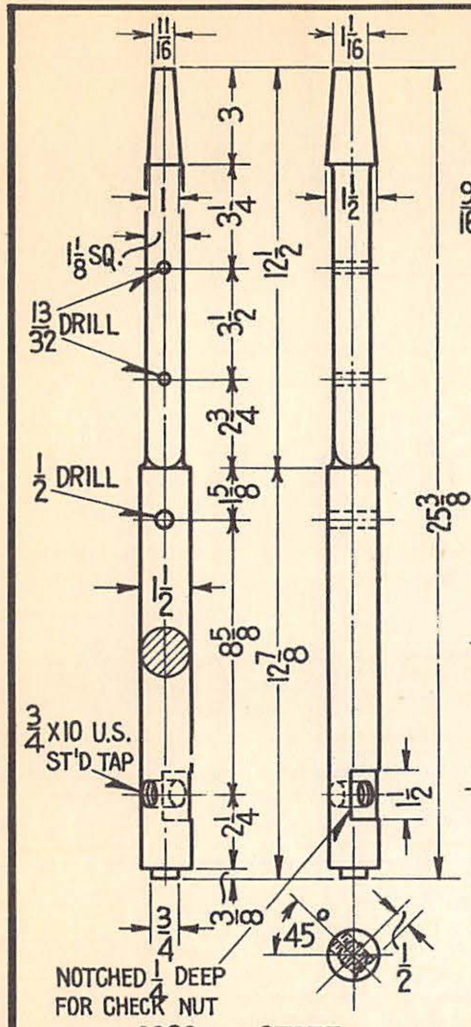
ISSUE	DATE
1	8-18-1927
2	9-14-1931

LOW DERAIL TARGET STAND
DETAILS AND ASSEMBLY

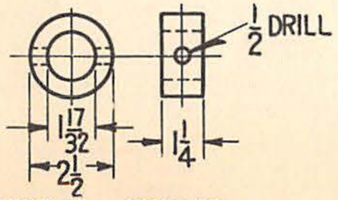
APPROVED BY REPRESENTATIVES OF LINES SHOWN.
JCMock
CHAIRMAN

WAH

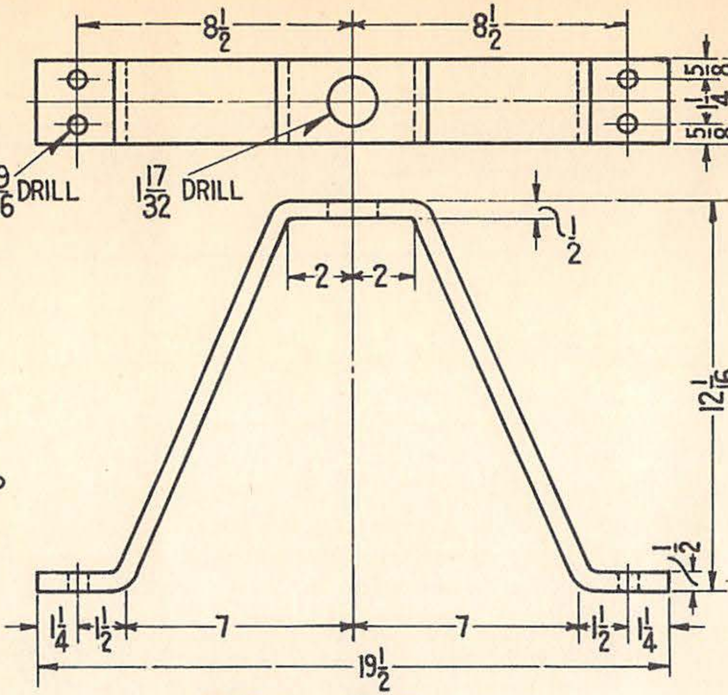
DEPT. 41
JAN 15 1932
U. S. G. S. CO.


11/16
1 1/16
3
3 1/4
12 1/2
1 1/8 SQ.
1
1 1/2
13/32 DRILL
3 1/2
2 3/4
1/2 DRILL
1 5/8
25 3/8
1 1/2
8 5/8
12 7/8
3/4 X 10 U.S. ST'D TAP
2 1/4
1 1/2
3/4
3 1/8
45°
1/2
NOTCHED 1/4 DEEP FOR CHECK NUT

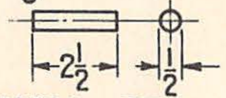
4980-1 STAFF
O. H. STEEL


1/2 DRILL
1 17/32
2 1/2
1 1/4

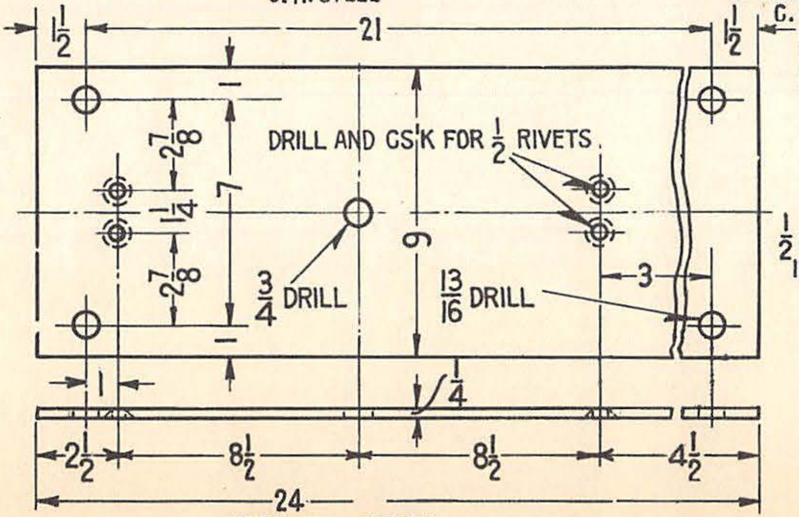
4980-2 COLLAR
O. H. STEEL


8 1/2
8 1/2
5/8
1 1/4
5/8
2 1/2
9/16 DRILL
1 17/32 DRILL
1/2
2
2
12 1/16
1/2
1 1/4
1 1/2
7
7
1 1/2
1 1/4
19 1/2

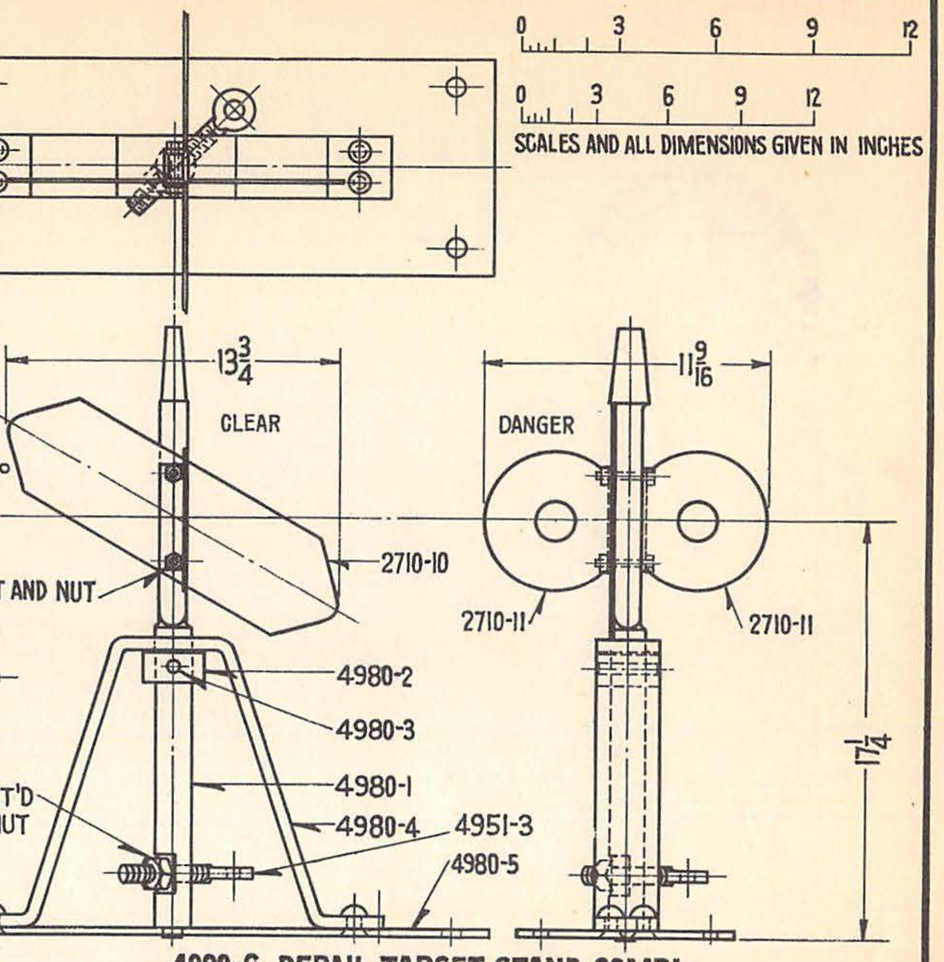
4980-4 STAND
O. H. STEEL



4980-3 PIN
C. R. STEEL


1 1/2
21
1 1/2
2 7/8
7
1 1/4
2 7/8
DRILL AND CS'K FOR 1/2 RIVETS.
9
3/4 DRILL
13/16 DRILL
3
1
1/4
2 1/2
8 1/2
8 1/2
4 1/2
24
1/2 X 1 3/8 CS'K HD. IRON RIVETS

4980-5 BASE
O. H. STEEL


0
3
6
9
12
0
3
6
9
12
13 3/4
CLEAR
30°
2710-10
3/8 X 2-HEX. HD. BOLT AND NUT
4980-2
4980-3
4980-1
4980-4
4951-3
4980-5
3/4 X 10-U.S. ST'D HEX. CHECK NUT
11 9/16
DANGER
2710-11
2710-11
17 1/4

SCALES AND ALL DIMENSIONS GIVEN IN INCHES

4980-6 DERAIL TARGET STAND COMPL.

NOTE: When Ordering give Number and Name in Large Type.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N. Y. C. R. R. (E).
N. Y. C. R. R. (W).
N. Y. C. R. R. (OCL).
B. & A. R. R.
M. C. R. R.
C. C. C. & ST. L. RY.
P. & L. E. R. R.
RUT. L. R. R.

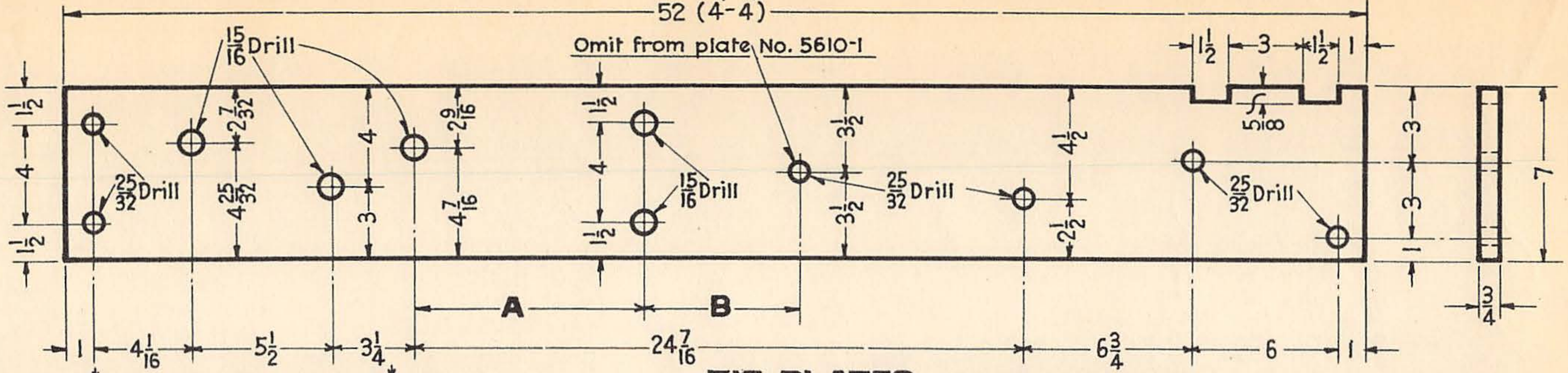
4980

ISSUE	DATE
1	11-23-1916
2	9-24-1921
3	6-19-1922
4	4-7-1931

DERAIL TARGET STAND

Approved by Representatives of Lines Shown.
JC Mock
Chairman

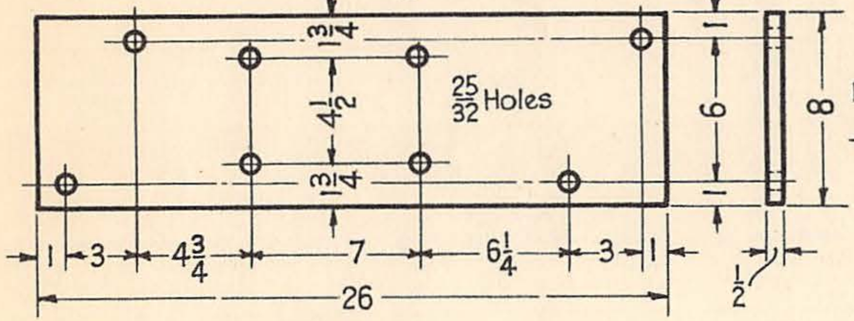
DEPT. 41
JAN
15
1932
U. S. & S. CO.


52 (4'-4")
15/16 Drill
Omit from plate No. 5610-1
1 1/2 — 3 — 1 1/2 — 1
5/8
25/32 Drill
15/16 Drill
25/32 Drill
25/32 Drill
A
B
1 — 4 1/16 — 5 1/2 — 3 1/4 — 24 7/16 — 6 3/4 — 6 — 1
7
3/4

TIE PLATES — Mild Steel (see table)

TIE PLATES			
ORD. NO.	**A**	**B**	**USAGE**
5610-1	9 3/16"	NOT REQD.	127 lb. Rail
5610-2	8 13/16"	5 3/4"	100, 105, 112, 115 lb. Rail
5610-3	8 5/16"	6 1/4"	80, 90 lb. Rail

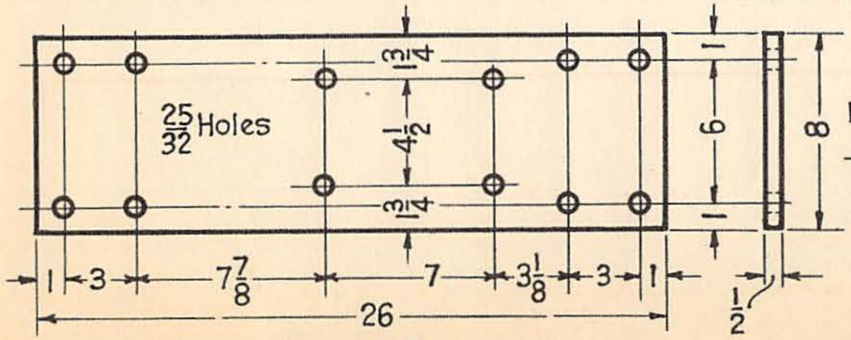
For Hayes Derail Layout 5600


25/32 Holes
1 3/4
4 1/2
1 3/4
1 — 6 — 1
8
1 — 3 — 4 3/4 — 7 — 6 1/4 — 3 — 1
26
1/2

For Layouts 5700-5900

5610-4

PLUNGER-LOCK BASE PLATES — Mild Steel


25/32 Holes
1 3/4
4 1/2
1 3/4
1 — 6 — 1
8
1 — 3 — 7 7/8 — 7 — 3 1/8 — 3 — 1
26
1/2

For Layout 5600

5610-5

Scales: 1 1/2 and 2 in. = 1 Ft.

NOTE: When ordering parts give number and name shown in large type.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST. L.Ry.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

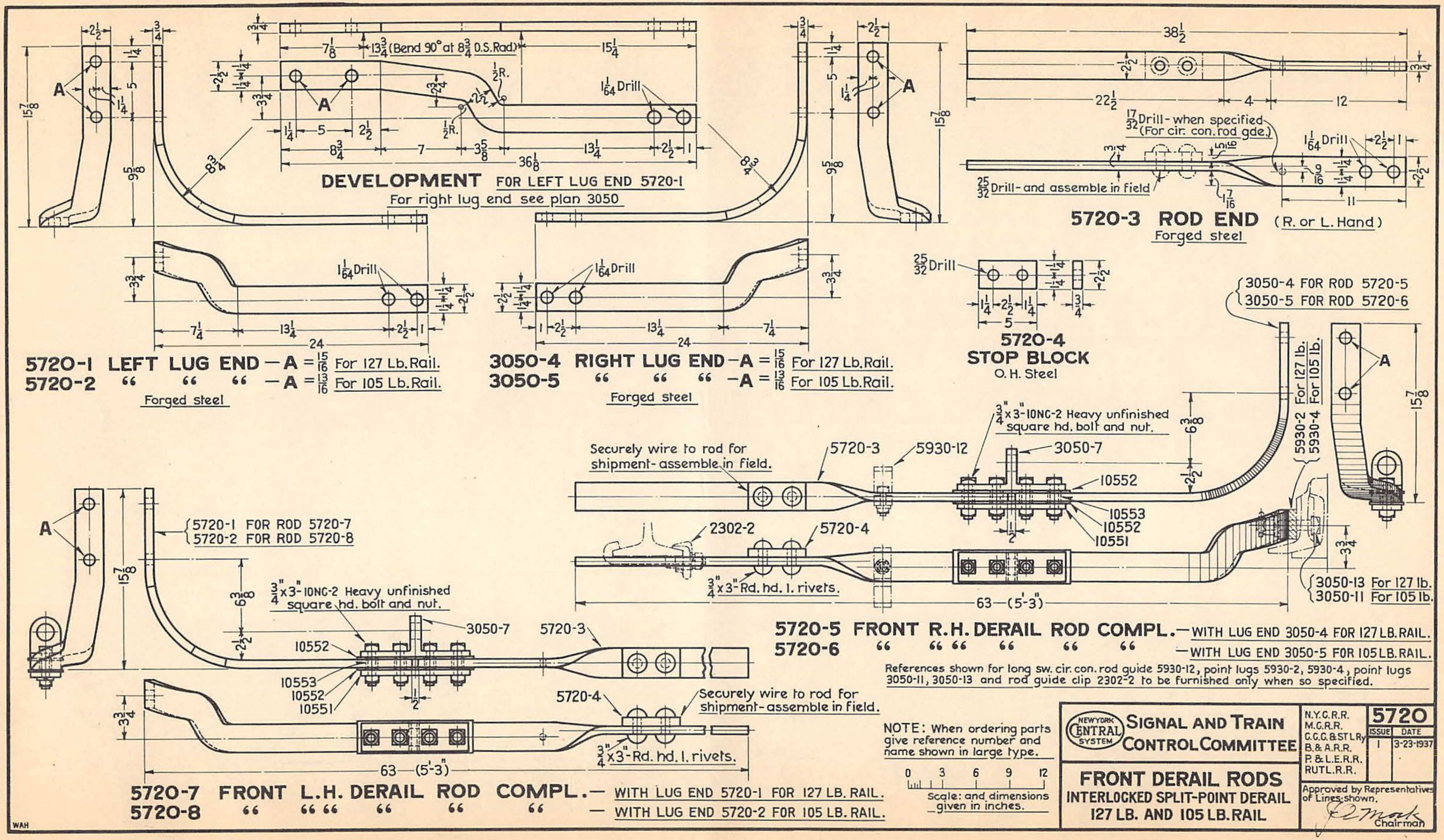
5610

ISSUE	DATE
1	3-25-1936

TIE AND PLUNGER-LOCK PLATES

Approved by Representatives of Lines shown.
J C Mock
Chairman

DEPT. 41
JUL 3 1936
U. S. & S. CO.



A
1 1/64 Drill
13 3/4 (Bend 90° at 8 3/4 O.S. Rad.)
1/2 R.
36 1/8
38 1/2
22 1/2
17/32 Drill - when specified (For cir. con. rod gde.)
25/32 Drill - and assemble in field
25/32 Drill
3050-4 FOR ROD 5720-5
3050-5 FOR ROD 5720-6
5930-2 For 127 lb.
5930-4 For 105 lb.
3/4" x 3" - 10NC-2 Heavy unfinished square hd. bolt and nut.
Securely wire to rod for shipment - assemble in field.
5720-3
5930-12
3050-7
10552
10553
10551
2302-2
5720-4
3/4" x 3" Rd. hd. l. rivets.
63 — (5'-3")
3050-13 For 127 lb.
3050-11 For 105 lb.
5720-1 FOR ROD 5720-7
5720-2 FOR ROD 5720-8
WAH

DEVELOPMENT FOR LEFT LUG END 5720-1
For right lug end see plan 3050

5720-1 LEFT LUG END — A = 15/16 For 127 Lb. Rail.
5720-2 " " " — A = 13/16 For 105 Lb. Rail.
Forged steel

3050-4 RIGHT LUG END — A = 15/16 For 127 Lb. Rail.
3050-5 " " " — A = 13/16 For 105 Lb. Rail.
Forged steel

5720-4
STOP BLOCK
O. H. Steel

5720-3 ROD END (R. or L. Hand)
Forged steel

5720-5 FRONT R.H. DERAIL ROD COMPL. — WITH LUG END 3050-4 FOR 127 LB. RAIL.
5720-6 " " " " " " — WITH LUG END 3050-5 FOR 105 LB. RAIL.

References shown for long sw. cir. con. rod guide 5930-12, point lugs 5930-2, 5930-4, point lugs 3050-11, 3050-13 and rod guide clip 2302-2 to be furnished only when so specified.

5720-7 FRONT L.H. DERAIL ROD COMPL. — WITH LUG END 5720-1 FOR 127 LB. RAIL.
5720-8 " " " " " " — WITH LUG END 5720-2 FOR 105 LB. RAIL.

NOTE: When ordering parts give reference number and name shown in large type.

0 3 6 9 12
Scale: and dimensions given in inches.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

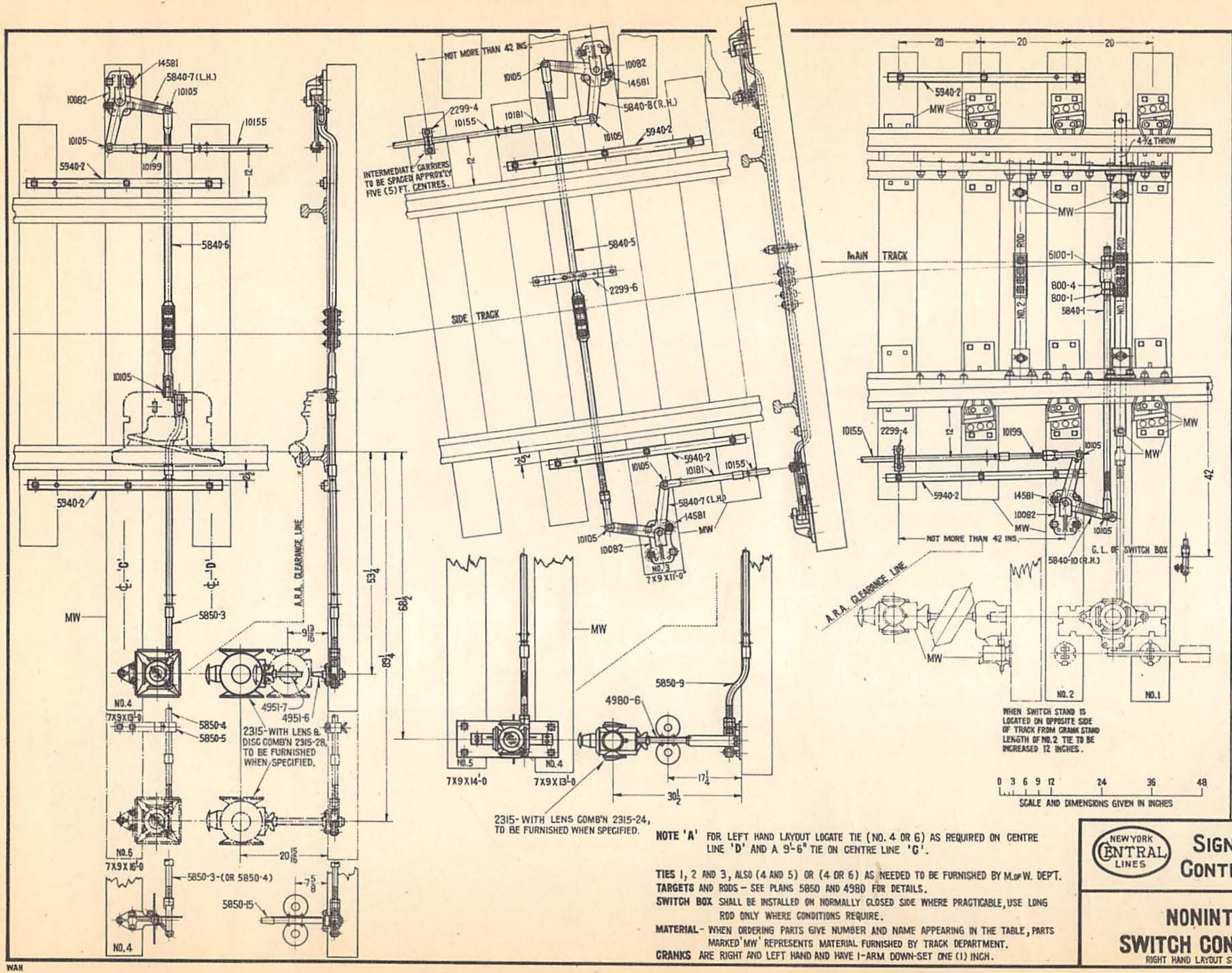
N.Y.C.R.R.
M.C.R.R.
C.C.C. & St.L.Ry.
B. & A.R.R.
P. & L.E.R.R.
RUTL.R.R.

5720

ISSUE	DATE
1	3-23-1937

FRONT DERAIL RODS
INTERLOCKED SPLIT-POINT DERAIL
127 LB. AND 105 LB. RAIL

Approved by Representatives of Lines shown.
Chairman


14581
5840-7 (L.H.)
10082
10105
10155
5940-2
10199
12
5840-6
5850-3
MW
NO.4
7X9X13'-0
5850-4
5850-5
NO.6
7X9X16'-0
5850-3-(OR 5850-4)
5850-15
C.L. 'C'
C.L. 'D'
A.R.A. CLEARANCE LINE
9 13/16
53 1/4
68 1/2
89 1/4
4951-7
4951-6
2315-WITH LENS & DISC COMB'N 2315-28, TO BE FURNISHED WHEN SPECIFIED.
20 15/16
7 5/8
NOT MORE THAN 42 INS.
2299-4
10181
5840-8 (R.H.)
INTERMEDIATE CARRIERS TO BE SPACED APPROX'LY FIVE (5) FT. CENTRES.
5840-5
2299-6
SIDE TRACK
5840-7 (L.H.)
NO.3
7X9X11'-0
NO.5
7X9X14'-0
4980-6
5850-9
17 1/4
30 1/2
2315-WITH LENS COMB'N 2315-24, TO BE FURNISHED WHEN SPECIFIED.
20
4 1/4 THROW
MAIN TRACK
ROD
NO.2
NO.1
5100-1
800-4
800-1
5840-1
42
G.L. OF SWITCH BOX
5840-10 (R.H.)
NO.2
NO.1
WHEN SWITCH STAND IS LOCATED ON OPPOSITE SIDE OF TRACK FROM CRANK STAND LENGTH OF NO.2 TIE TO BE INCREASED 12 INCHES.
0 3 6 9 12 24 36 48
SCALE AND DIMENSIONS GIVEN IN INCHES
WAH

REFERENCE N.Y.C.L.	REFERENCE A.R.A.	FURNISHED BY SIG. DEP.	FURNISHED BY M. of W.	NAME	FOR
		8		BOLT SQ. H. AND NUT 3/4 X 9 1/2	CRANK STAND
			8	" " " WITH HEX. NUT	SWITCH CLIP-WEB
			4	" " " " " "	" " -ROD
5840-7		2		CRANK-L.H. (WITH 1 HOLE ARMS) SP'Y DRIL- LING REQD.	NOTE: 2 RIGHT AND 2 LEFT HD. GRANKS REQD. FOR R.H. DERAIL LAYOUT AS DRAWN. CRANKS MAY BE TRANSPOSED FOR LEFT HAND LAYOUT.
5840-9				" " (" 2 " ")	
5840-11				" " (" 3 " ")	
5840-8		2		" R.H. (" 1 " ")	
5840-10				" " (" 2 " ")	
5840-12				" " (" 3 " ")	
5840-5		1		CROSS CONNECTING ROD	AT CENTRE LOCATION
	10082			CRANK STAND COMPL. WITH CENTRE PIN	
		9		COTTER 3/16 X 1 1/2	7/8 JAW PIN
			12	" 1/4	ALL SWITCH CLIP BOLTS
4951-6		1		TARGET STAND ONLY-LOW STAFF-DISC TYPE	ROD 5850-3, 4
4951-7		1		" " " -HIGH " - " "	" " "
4980-6		1		" " " -LOW STAND-BAN. "	" 5850-9
5850-15		1		" " " -HIGH STAFF- " "	" 5850-3, 4
5850-5		1		" " ROD GUIDE	LONG ROD 5850-4
5840-6		1		DERAIL CONNECTING ROD	DERAIL
		1		" ONLY - SPECIFY MODEL REQD.	
5850-3		1		TARGET ROD COMPL.-SHORT	TARGET 4951-6, 4951-7
5850-4		1		" " " -LONG	" " "
5850-9		1		" " " -MED.	" 4980-6
	10181	2		JAW - SOLID WITH TANG END	1 IN. PIPE CONNECTIONS
	10199	2		" - SCREW " " "	" " " "
			1	" - " " JAM NUT	SWITCH STAND ROD
		4		LAG SCREWS 3/4 X 6	TARGET 4980-6
		62		" " 1/2 X 3	1-WAY PIPE CARRIER
		2		" " 3/4 X 4	" " "
		32		" " 3/4 X 6	TIE STRAP - CRANK STAND
		5		" " 3/4 X 6	TARGET 5850-6 AND GUIDE
2315		1		LAMP - (LENS-DISC COMB'N 2315-28)	" 4951-6, 4951-7
2315		1		" -(LENS COMB'N 2315-24)	" 4980-6
2315			1	" -(" " 2315-20)	SWITCH STAND
800-1		2		NUT - JAM 1 1/4 X 7-U.S.S. TAP	SWITCH ADJ'T BRACKET
800-4		2		" - SLEEVE " - "	
			1	PIN	" STAND ROD
	10105	9		PIN - JAW	1 IN. PIPE CONNECTIONS
				PIPE INSULATION	SEE CONNECTING RODS
	10155	200 FT.		" AND PLUG	ESTIMATED
2299-4		31		" CARRIER - ONE-WAY	
2299-6		1		" " - "	CROSS-TRACK
	10153	28		RIVET 1/4 X 1 11/16	1 IN. SIGNAL PIPE
			AS REQD.	RAIL BRACES	
6100-1		1		SWITCH ADJ'T BRACKET	NO. 1 ROD
			AS REQD.	" PLATES	
			2	SWITCH CLIP - R.H.	
			2	" " - L.H.	
			2	" POINT RAILS	
			1	" STAND	
			1	" " CONNECTING ROD	
			1	" ROD NO. 1	
			1	" " - NO. 2	
			AS REQD.	TRACK SPIKES	
5840-1		1		THROW ROD	
5940-2		6		TIE STRAP	
	14581	8		WASHER - CAST IRON	
			8	" - SPRING	SWITCH CLIP BOLTS - WEB
			4	" - "	" " " - ROD

NOTE 'A' FOR LEFT HAND LAYOUT LOCATE TIE (NO. 4 OR 6) AS REQUIRED ON CENTRE LINE **'D'** AND A 9'-6" TIE ON CENTRE LINE **'C'**.

TIES 1, 2 AND 3, ALSO (4 AND 5) OR (4 OR 6) AS NEEDED TO BE FURNISHED BY M. OF W. DEP'T.

TARGETS AND RODS - SEE PLANS 5850 AND 4980 FOR DETAILS.

SWITCH BOX SHALL BE INSTALLED ON NORMALLY CLOSED SIDE WHERE PRACTICABLE, USE LONG ROD ONLY WHERE CONDITIONS REQUIRE.

MATERIAL - WHEN ORDERING PARTS GIVE NUMBER AND NAME APPEARING IN THE TABLE, PARTS MARKED 'MW' REPRESENTS MATERIAL FURNISHED BY TRACK DEPARTMENT.

CRANKS ARE RIGHT AND LEFT HAND AND HAVE 1-ARM DOWN-SET ONE (1) INCH.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

NONINTERLOCKED SWITCH CONNECTED DERAIL

RIGHT HAND LAYOUT SHOWN - SEE NOTE 'A'

N.Y.C.R.R. (E).
N.Y.C.R.R. (W).
N.Y.C.R.R. (OGL).
B. & A.R.R.
M.C.R.R.
C.C.C. & ST L.RY.
P. & L.E.R.R.
RUTL. R.R.

5800

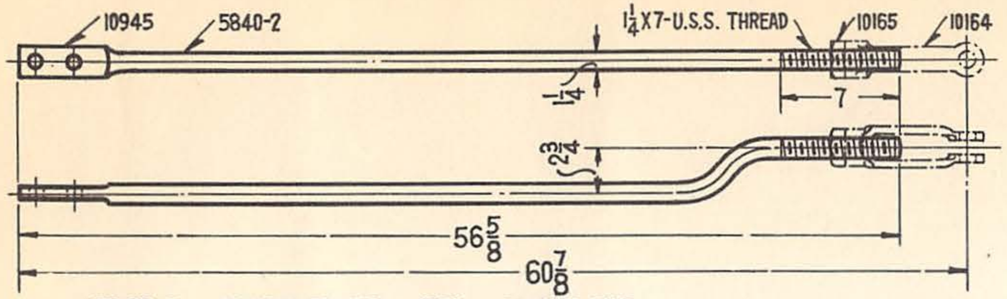
ISSUE	DATE
1	6-15-1922
2	5-15-1927
3	4-7-1931

APPROVED BY REPRESENTATIVES OF LINES SHOWN.

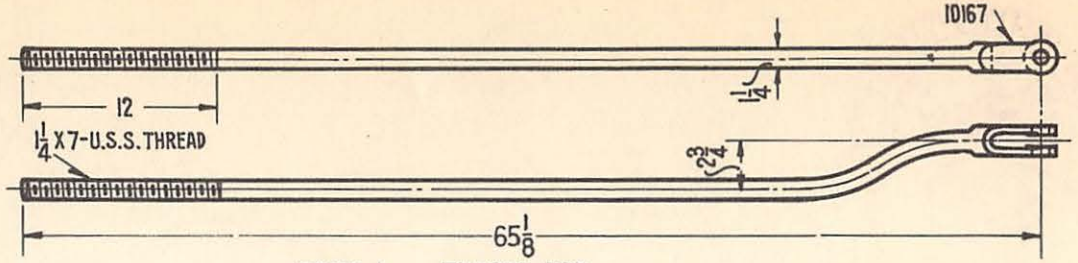
J. C. Mock
CHAIRMAN

#114309+
G.O. 376,454

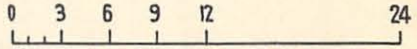
DEPT. 41
JAN
15
1932
U.S.&S. CO.


10945
5840-2
1¼X7-U.S.S. THREAD
10165
10164
1¼
7
2¾
56⅝
60⅞

5840-2 THREADED HALF-ROD—SPLICE END
5840-3 " " " —WITH SC. JAW AND NUT

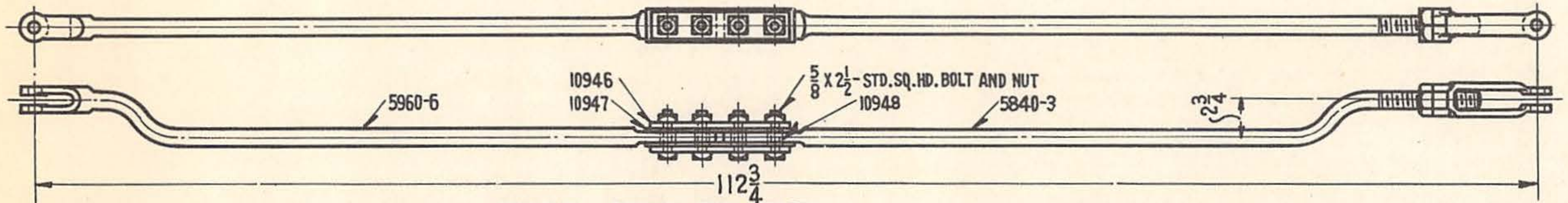

10167
1¼
12
1¼X7-U.S.S.THREAD
2¾
65⅛

5840-1 THROW ROD

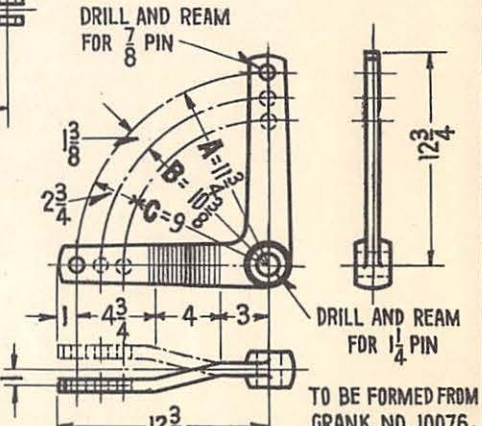


SCALE AND ALL DIMENSIONS GIVEN IN INCHES.

WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN LARGE TYPE.


10946
10947
⅝ X 2½-STD.SQ.HD.BOLT AND NUT
10948
5960-6
5840-3
2¾
112¾

5840-5 CROSS ROD COMPL.


DRILL AND REAM FOR ⅞ PIN
1⅜
A=11¾
B=10⅜
C=9
2¾
12¾
1
4¾
4
3
DRILL AND REAM FOR 1¼ PIN
12¾

TO BE FORMED FROM CRANK NO. 10076, A.R.A. PLAN 1007.

5840-7 L.H. CRANK
5840-8 R.H. " } WITH 1 HOLE: RADIUS-**A**.

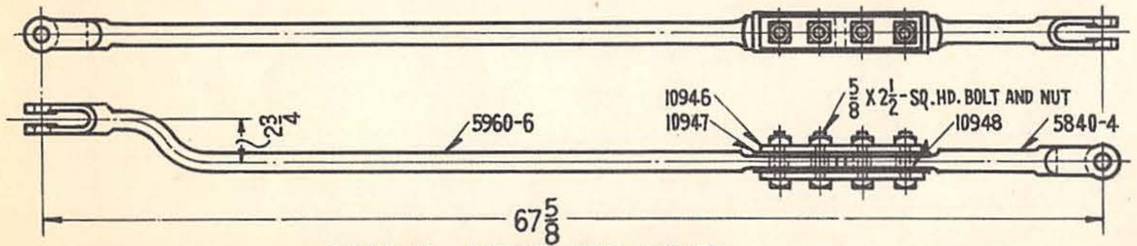
5840-9 L.H. "
5840-10 R.H. " } WITH 2 HOLES: RADIUS-**A** AND **B**.

5840-11 L.H. "
5840-12 R.H. " } WITH 3 HOLES: RADIUS-**A**, **B** AND **C**.

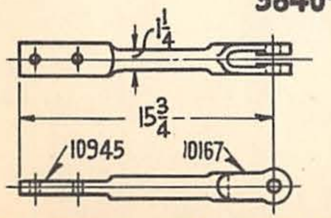
LEFT HAND CRANKS SHOWN IN FULL LINES.
RIGHT " " " " BROKEN LINES.

DIMENSIONS SHOWN ARE DEVELOPED LENGTHS.

ALL RODS AND CRANKS TO BE OF O.H. STEEL.


10946
10947
⅝ X 2½-SQ.HD.BOLT AND NUT
10948
5840-4
5960-6
2¾
67⅝

5840-6 DERAIL ROD COMPL.


1¼
15¾
10945
10167

5840-4 SOLID JAW HALF-ROD— SPLICE END

SEE PLAN 5800 FOR GENERAL LAYOUT OF DERAIL CONNECTIONS

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

SWITCH FITTINGS RODS AND CRANKS

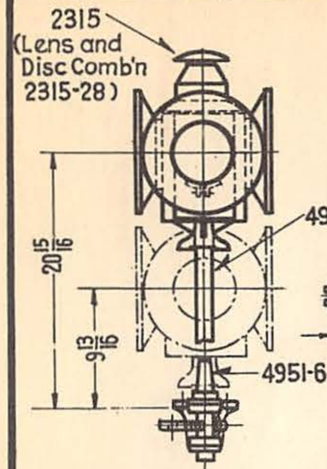
N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(DCL).
B.&A.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
P.&L.E.R.R.
RUTL.R.R.

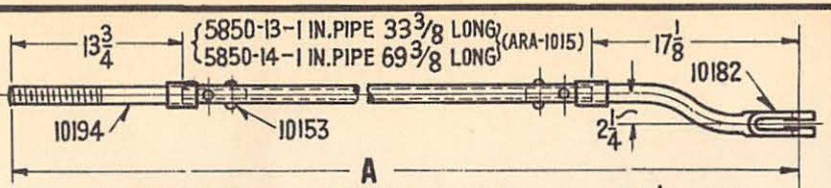
5840

ISSUE	DATE
1	6-15-1922
2	5-15-1924
3	11-15-1924
4	4-7-1931

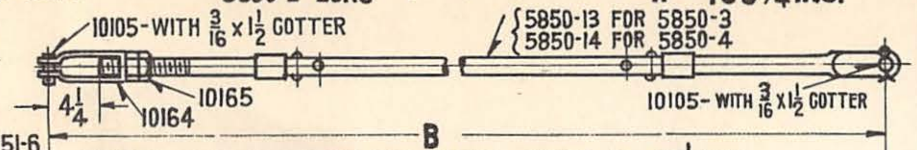
APPROVED BY REPRESENTATIVES OF LINES SHOWN.
JC Mock
CHAIRMAN

DEPT. 41
JAN
15
1932
U. S. & S. CO.


2315 (Lens and Disc Comb'n 2315-28)
4951-7
20 15/16
9 13/16
4951-6


13 3/4
{5850-13-1 IN.PIPE 33 3/8 LONG
5850-14-1 IN.PIPE 69 3/8 LONG} (ARA-1015)
17 1/8
10182
10194
10153
2 1/4
A

5850-1 SHORT ROD ONLY AS SHOWN — A = 64 1/4 INS.
5850-2 LONG " " " " — A = 100 1/4 INS.


10105-WITH 3/16 x 1 1/2 COTTER
{5850-13 FOR 5850-3
5850-14 FOR 5850-4
4 1/4
10165
10164
10105- WITH 3/16 X 1 1/2 COTTER
B

5850-3 DERAIL TARGET ROD COMPL.-SHORT B = 68 1/2 INS.
5850-4 " " " " -LONG B = 104 1/2 INS.

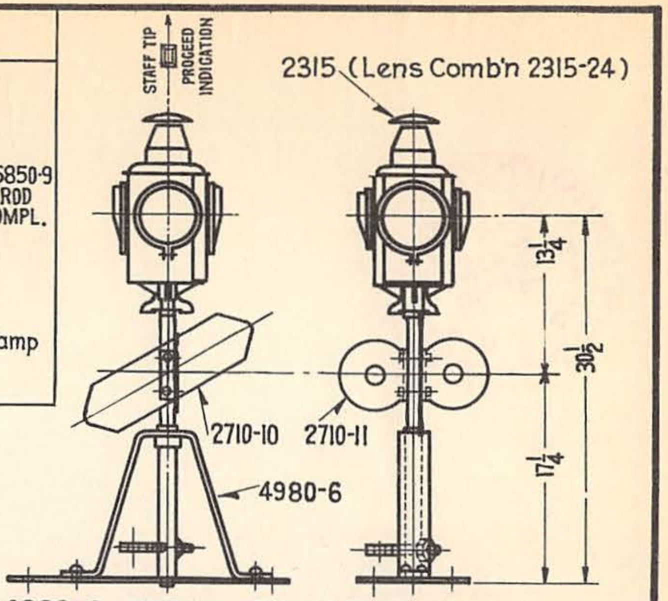
4951-6 DERAIL TARGET STAND COMPL. - With Low Staff 4951-4 }
4951-7 " " " " - With High Staff 4951-5 } Except Lamp and Discs.
(Lamp and Discs as shown to be furnished when specified)

REFERENCES N.Y.C.L.	REFERENCES A.R.A.	REQD.	NAME	
		2	COTTER 3/16 X 1 1/2	5850-9 ROD COMPL.
	10152	2	COUPLING - 1 IN. PIPE	
	10181	1	JAW - STRAIGHT SOLID	
	10164	1	" - SCREW 1 1/4 X7-U.S.S.TAP	
	10165	1	NUT - HEX. JAM 1 1/4 X7-TAP	
	10105	2	PIN 7/8 X 2 1/4 - 1 1/4 JAWS	
5850-18		1	PIPE - 1 IN. (ARA-1015)	
	10153	4	RIVET 1/4 X 1 11/16 - PIPE JTS.	
	13601	1	THREADED TANG END - SET	
4980-6		1	DER. TAR. STD. COMP.- Except lamp	
2315		1	LAMP (LENS COMB. 2315-24)	
		4	LAG SCREWS 3/4 X 6	

0 3 6 9 12 24 36

SCALE AND ALL DIMENSIONS GIVEN IN INCHES

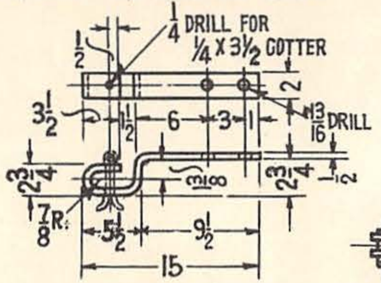
WHEN ORDERING APPARATUS OR PARTS SHOWN ON THIS PLAN GIVE NUMBER AND NAME APPEARING IN LARGE TYPE AND IN THE TABLE.

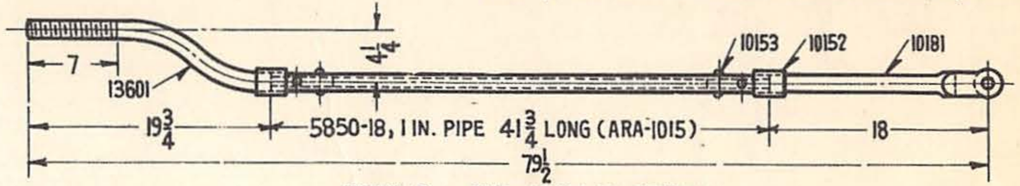

STAFF TIP
PROCEED INDICATION
2315 (Lens Comb'n 2315-24)
13 1/4
30 1/2
17 1/4
2710-10
2710-11
4980-6

4980-6 DERAIL TARGET STAND COMPL.
(Lamp as shown to be furnished when specified)

5850-5 GUIDE

O. H. STEEL — FOR LONG ROD 5850-4

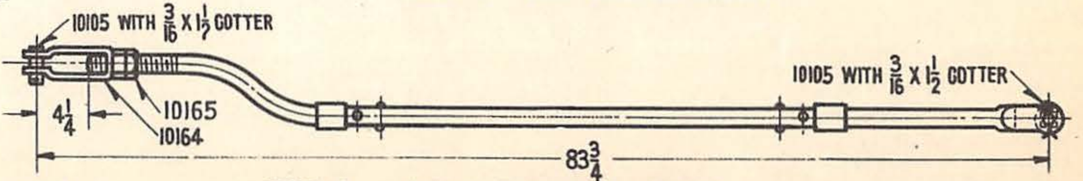

1/4 DRILL FOR 1/4 X 3 1/2 COTTER
1/2
3 1/2
1 1/2
6
3
1
2
13/16 DRILL
2 3/4
3/8
2 3/4
1/2
7/8 R.
5 1/2
9 1/2
15


4 1/4
7
13601
10153
10152
10181
19 3/4
5850-18, 1 IN. PIPE 41 3/4 LONG (ARA-1015)
18
79 1/2

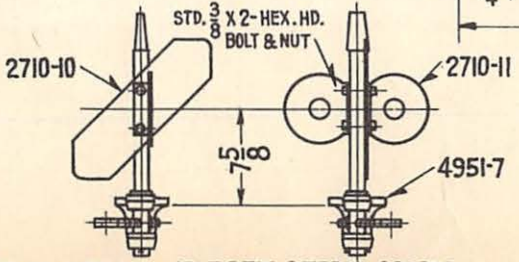
5850-8 ROD ONLY AS SHOWN

TABLE OF PARTS REQD. FOR COMPL. RODS AND TARGET STANDS

REFERENCES N.Y.C.L.	REFERENCES A.R.A.	REQD.	NAME		
		2	COTTER 3/16 X 1 1/2	SHORT ROD 5850-3 COMPL.	LONG ROD 5850-4 COMPL.
	10164	1	JAW-SCREW-1 1/4 X7-THD.		
	10182	1	JAW-SOLID-OFFSET		
	10165	1	JAM NUT- 1 1/4 X7- TAP		
	10105	2	PINS - 7/8 X 2 1/4		
5850-13		1	PIPE - 1 IN.-(ARA-1015)		
	10153	4	RIVETS- 1/4 X 1 11/16		
	10194	1	THREADED TANG END		
5850-14		1	PIPE-1 IN.-(ARA-1015)		
5850-5		1	GUIDE WITH 1/4 X 3 1/2 COTTER		
		2	LAG SCREWS-3/4 X 6 - FOR GUIDE		
4951-6		1	DER. TARGET STAND COMP.-LOW STAFF 4951-4 } Except Lamp		
4951-7		1	" " " " -HIGH STAFF 4951-5 }		
2315		1	LAMP COMPL.- LENS & DISC COMB'N 2315-28		
		3	LAG SCREWS - 3/4 X 6-FOR STAND		


10105 WITH 3/16 X 1 1/2 COTTER
4 1/4
10165
10164
10105 WITH 3/16 X 1 1/2 COTTER
83 3/4

5850-9 DERAIL TARGET ROD COMPL.


STD. 3/8 X 2-HEX. HD. BOLT & NUT
2710-10
2710-11
7 5/8
4951-7

5850-15 DERAIL TARGET STAND COMPL.
{ Lamp 2315 with Lens Comb'n 2315-24 to be furnished when specified }

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

DERAIL TARGET
STANDS AND CONNECTIONS

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST L.RY.
P.& L.E.R.R.
RUTL.R.R.

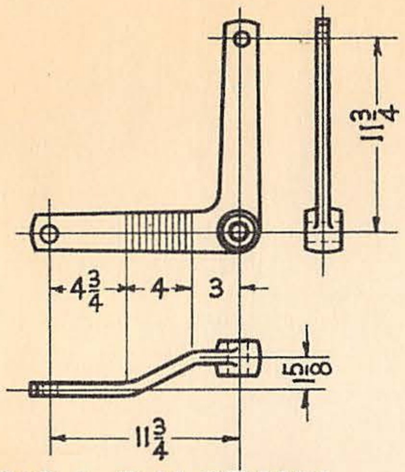
5850

ISSUE	DATE
1	6-15-1922
2	8-15-1923
3	1-15-1925
4	5-15-1927
5	4-7-1931

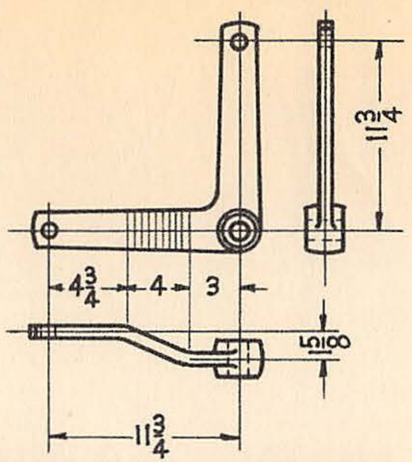
APPROVED BY REPRESENTATIVES OF LINES SHOWN.
J C Mock
CHAIRMAN

WAH

DEPT. 41
JAN 15 1932
U. S. & S. CO.


11¾
4¾
4
3
5/8
11¾

5910-1 R.H. CRANK

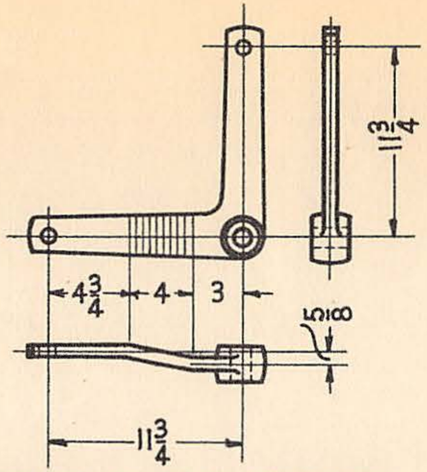

11¾
4¾
4
3
5/8
11¾

5910-2 L.H. CRANK

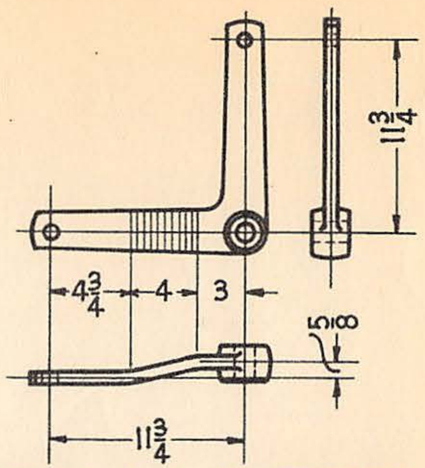
FOR LAYOUTS 5700-5900

For R.H. Layout at connection – Ⓑ
For L.H. Layout at connection – Ⓓ

For R.H. Layout at connection – Ⓓ
For L.H. Layout at connection – Ⓑ


11¾
4¾
4
3
5/8
11¾

5910-3 R.H. CRANK

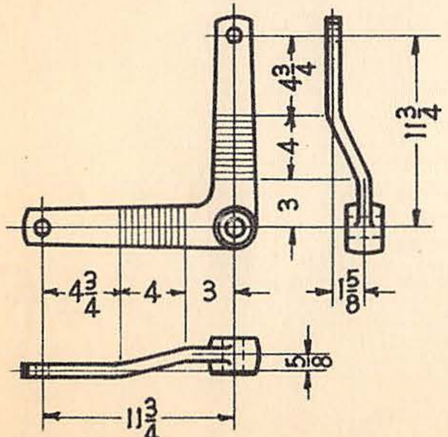

11¾
4¾
4
3
5/8
11¾

5910-4 L.H. CRANK

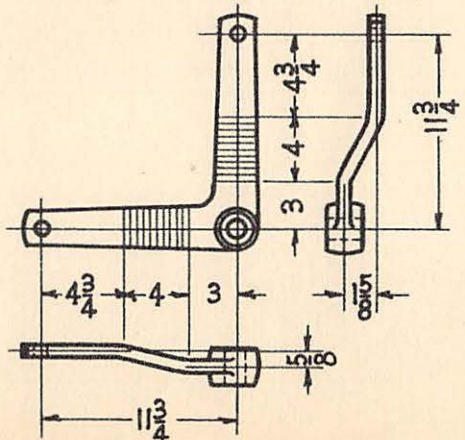
FOR LAYOUT 5600

For R.H. Layout at connection – Ⓐ
For L H Layout at connection – Ⓒ

For R.H. Layout at connection – Ⓒ
For L.H. Layout at connection – Ⓐ


4¾
4
3
11¾
4¾
4
3
1⅝
5/8
11¾

5910-5 R.H. CRANK


4¾
4
3
11¾
4¾
4
3
1⅝
5/8
11¾

5910-6 L.H. CRANK

FOR LAYOUT 5600

For R.H. Layout at connection – Ⓑ
For L.H. Layout at connection – Ⓓ

For R.H. Layout at connection – Ⓓ
For L.H. Layout at connection – Ⓑ

Scale: 1 in. = 1 ft., all dimensions given in inches.

NOTES: All cranks to be formed from A.A.R. 10076.

When ordering parts give number and name shown in large type.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUT.L.R.R.

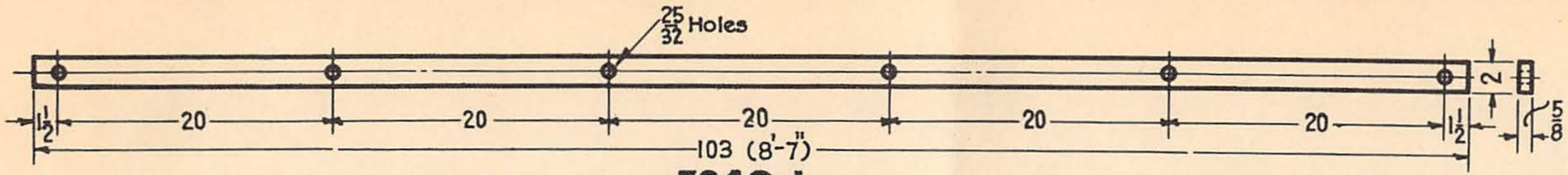
5910	
ISSUE	DATE
3	3-16-1936

FORGED CRANKS

Approved by Representatives of Lines shown.

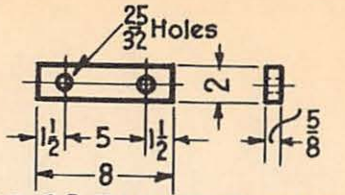
JCMock
Chairman

DEPT. 41
JUL
3
1936
U.S.S.&S. CO.



$\frac{25}{32}$ Holes
2
$\frac{5}{8}$
$1\frac{1}{2}$
20
20
20
20
20
$1\frac{1}{2}$
103 (8'-7")

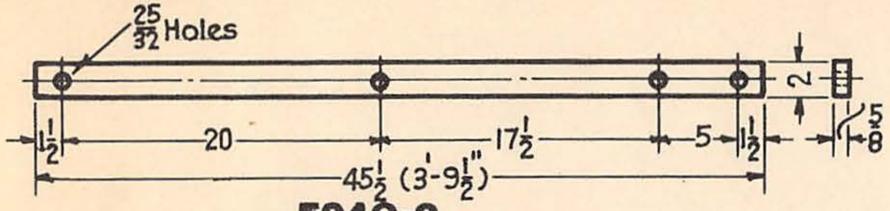
5940-1



$\frac{25}{32}$ Holes
2
$\frac{5}{8}$
$1\frac{1}{2}$
5
$1\frac{1}{2}$
8

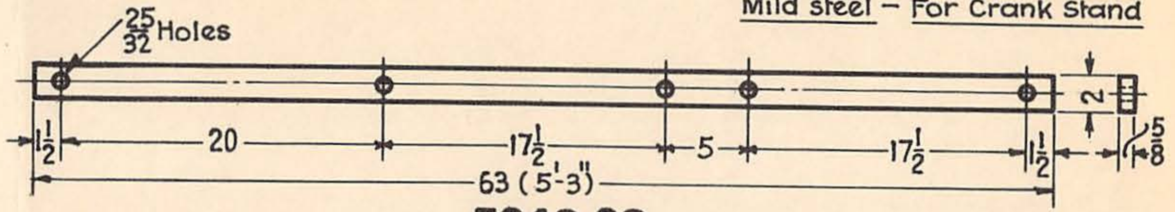
5940-23 RISER STRAP

Mild steel – For Crank Stand



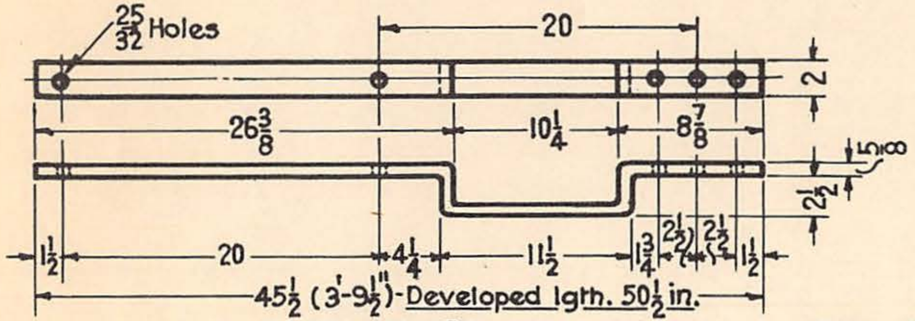
$\frac{25}{32}$ Holes
2
$\frac{5}{8}$
$1\frac{1}{2}$
20
$17\frac{1}{2}$
5
$1\frac{1}{2}$
$45\frac{1}{2}$ (3'-$9\frac{1}{2}$")

5940-2



$\frac{25}{32}$ Holes
2
$\frac{5}{8}$
$1\frac{1}{2}$
20
$17\frac{1}{2}$
5
$17\frac{1}{2}$
$1\frac{1}{2}$
63 (5'-3")

5940-20

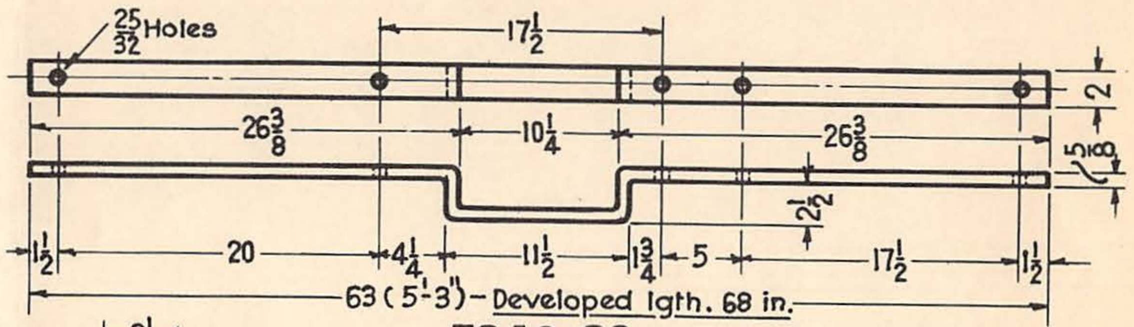


$\frac{25}{32}$ Holes
20
2
$26\frac{3}{8}$
$10\frac{1}{4}$
$8\frac{7}{8}$
$\frac{5}{8}$
$2\frac{1}{2}$
$1\frac{1}{2}$
20
$4\frac{1}{4}$
$11\frac{1}{2}$
$1\frac{3}{4}$
$2\frac{1}{2}$
$2\frac{1}{2}$
$1\frac{1}{2}$
$45\frac{1}{2}$ (3'-$9\frac{1}{2}$")-Developed lgth. $50\frac{1}{2}$ in.

5940-21

TIE STRAPS

Mild steel

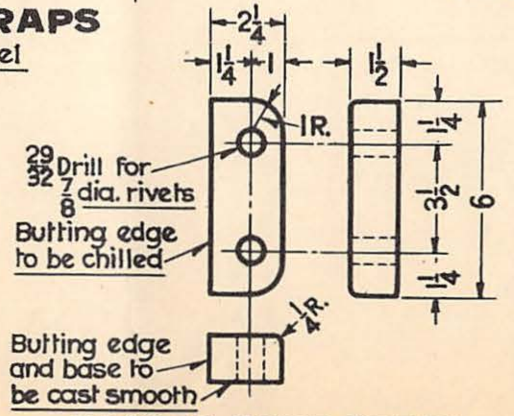


$\frac{25}{32}$ Holes
$17\frac{1}{2}$
2
$26\frac{3}{8}$
$10\frac{1}{4}$
$26\frac{3}{8}$
$\frac{5}{8}$
$2\frac{1}{2}$
$1\frac{1}{2}$
20
$4\frac{1}{4}$
$11\frac{1}{2}$
$1\frac{3}{4}$
5
$17\frac{1}{2}$
$1\frac{1}{2}$
63 (5'-3") – Developed lgth. 68 in.

5940-22

USAGE

5940-1	1	Req'd with all conns. for Layouts 3000-5700-5900
5940-2	1	" " conns. A-C-D for Layouts 5700-5900
	1	" " " A-B for Layout 3000
5940-21	1	" " " A-C-D for Layouts 5700-5900
	2	" " " B-C-D for Layouts 5700-5900
	1	" " " A-B for Layout 3000
5940-22	1	" " " B-D for Layout 5600
5940-20	2	" " " A-C for Layout 5600
	1	" " " B-D for Layout 5600



$2\frac{1}{4}$
$1\frac{1}{4}$
1
$\frac{1}{2}$
1R.
$\frac{29}{32}$ Drill for $\frac{7}{8}$ dia. rivets
Butting edge to be chilled
$1\frac{1}{4}$
$3\frac{1}{2}$
$1\frac{1}{4}$
6
$\frac{1}{4}$R.
Butting edge and base to be cast smooth

5940-19 BUTT STRAP

Cast iron

When ordering parts give number and name shown in large type.

All dimensions given in inches except as shown.

Scales: 1 in. and 2 in. = 1 ft.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

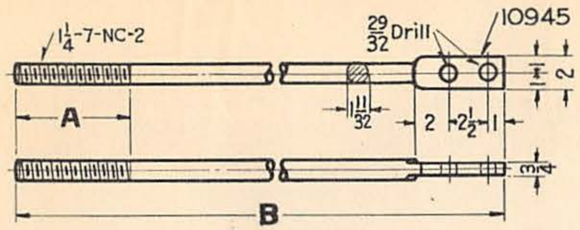
5940

ISSUE	DATE
4	8-20-1936
5	1-18-1937

TIE AND BUTT STRAPS

Approved by Representatives of Lines shown.

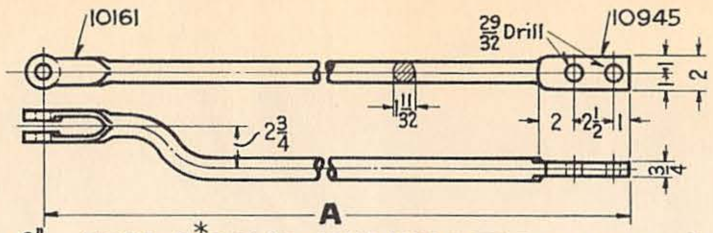
JC Mock
Chairman



$1\frac{1}{4}$-7-NC-2
$\frac{29}{32}$ Drill
10945
A
$1\frac{11}{32}$
2
$2\frac{1}{2}$
1
$\frac{1}{2}$
2
$\frac{3}{4}$
B

5960-1 THREADED HALF-ROD Splice end **A** = 12" **B** = $74\frac{3}{4}$"
5960-2 " " " **A** = 19" **B** = $74\frac{3}{4}$"
5960-3 " " " **A** = 7" **B** = $55\frac{3}{4}$"

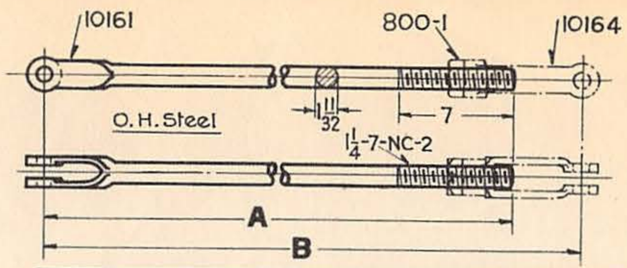
O. H. Steel



10161
$\frac{29}{32}$ Drill
10945
$1\frac{11}{32}$
2
$2\frac{1}{2}$
1
$\frac{1}{2}$
2
$\frac{3}{4}$
$2\frac{3}{4}$
A

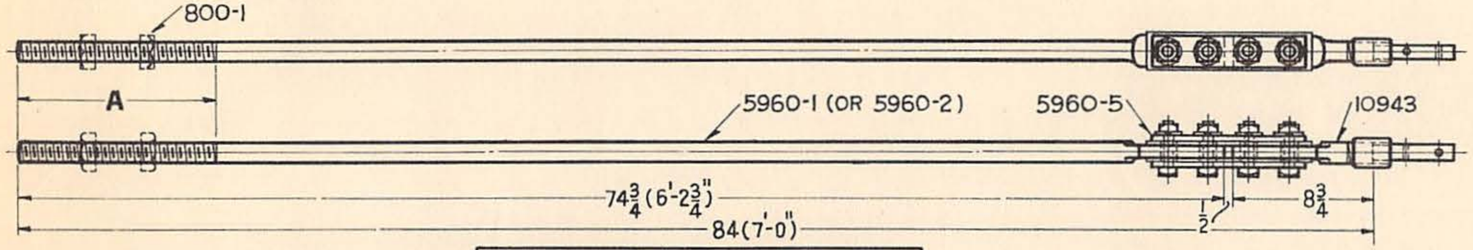
5960-6* SOLID JAW HALF-ROD Splice end **A** = $51\frac{3}{8}$"
5960-7 " " " " **A** = 58"

O. H. Steel
(* Used with Cross Rod 5840-5)



10161
800-1
10164
O. H. Steel
$1\frac{11}{32}$
7
$1\frac{1}{4}$-7-NC-2
A
B

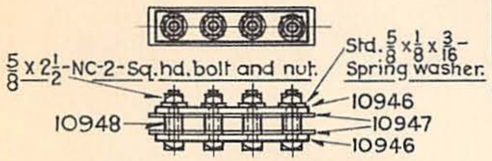
PLUNGER-LOCK CONNECTING RODS					
ROD ONLY		**ROD COMPL.** With Screw Jaw and Nut			
ORD. NO.	**A**	ORD. NO.	**B**	For Conns.	Layout
5960-15	$30\frac{1}{4}$"	**5960-16**	$34\frac{1}{2}$"	'A' and 'B'	5700 5900
5960-17	$28\frac{3}{4}$"	**5960-18**	33"	'C' and 'D'	
5960-19	$27\frac{1}{8}$"	**5960-20**	$31\frac{3}{8}$"	'A' and 'B'	5600
5960-21	$31\frac{7}{8}$"	**5960-22**	$36\frac{1}{8}$"	'C' and 'D'	



800-1
A
5960-1 (OR 5960-2)
5960-5
10943
$74\frac{3}{4}$ (6'-$2\frac{3}{4}$")
84 (7'-0")
$\frac{1}{2}$
$8\frac{3}{4}$

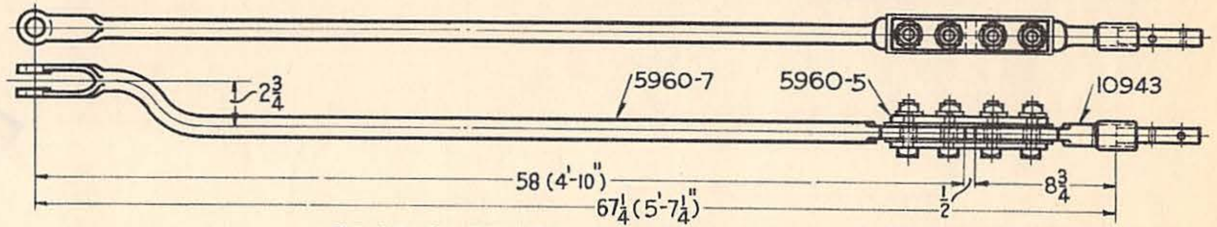
THROW RODS COMPL. Insulated			
Without Jam Nuts	**A**	With Half-rod	With Jam Nuts
ORD. NO.			ORD. NO.
5960-9	12"	5960-1	**5960-11**
5960-10	19"	5960-2	**5960-12**

(First made for Layouts 5700-5900)



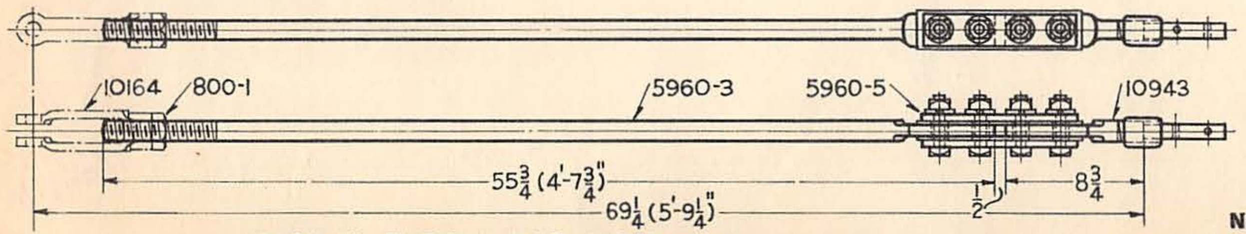
$\frac{5}{8}$ x $2\frac{1}{2}$-NC-2-Sq. hd. bolt and nut.
Std. $\frac{5}{8}$ x $\frac{1}{8}$ x $\frac{3}{16}$- Spring washer.
10946
10947
10946
10948

5960-5 INSULATING SPLICE PARTS COMPL.



$2\frac{3}{4}$
5960-7
5960-5
10943
58 (4'-10")
$67\frac{1}{4}$ (5'-$7\frac{1}{4}$")
$\frac{1}{2}$
$8\frac{3}{4}$

5960-8 CROSS CONNECTING ROD COMPL. Insulated
(First made for Layouts 5600-5700-5900)



10164
800-1
5960-3
5960-5
10943
$55\frac{3}{4}$ (4'-$7\frac{3}{4}$")
$69\frac{1}{4}$ (5'-$9\frac{1}{4}$")
$\frac{1}{2}$
$8\frac{3}{4}$

5960-13 THROW ROD ONLY Insulated
5960-14 " " **COMPL.** With Screw Jaw and Jam Nut.
(First made for Layout 5600 - and B. L. Connection for Layouts 5700-5900)

NOTE: When ordering parts give number and name shown in large type.

0 3 6 9 12
Scale: and dimensions given in inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**

THROW RODS
CONNECTING RODS

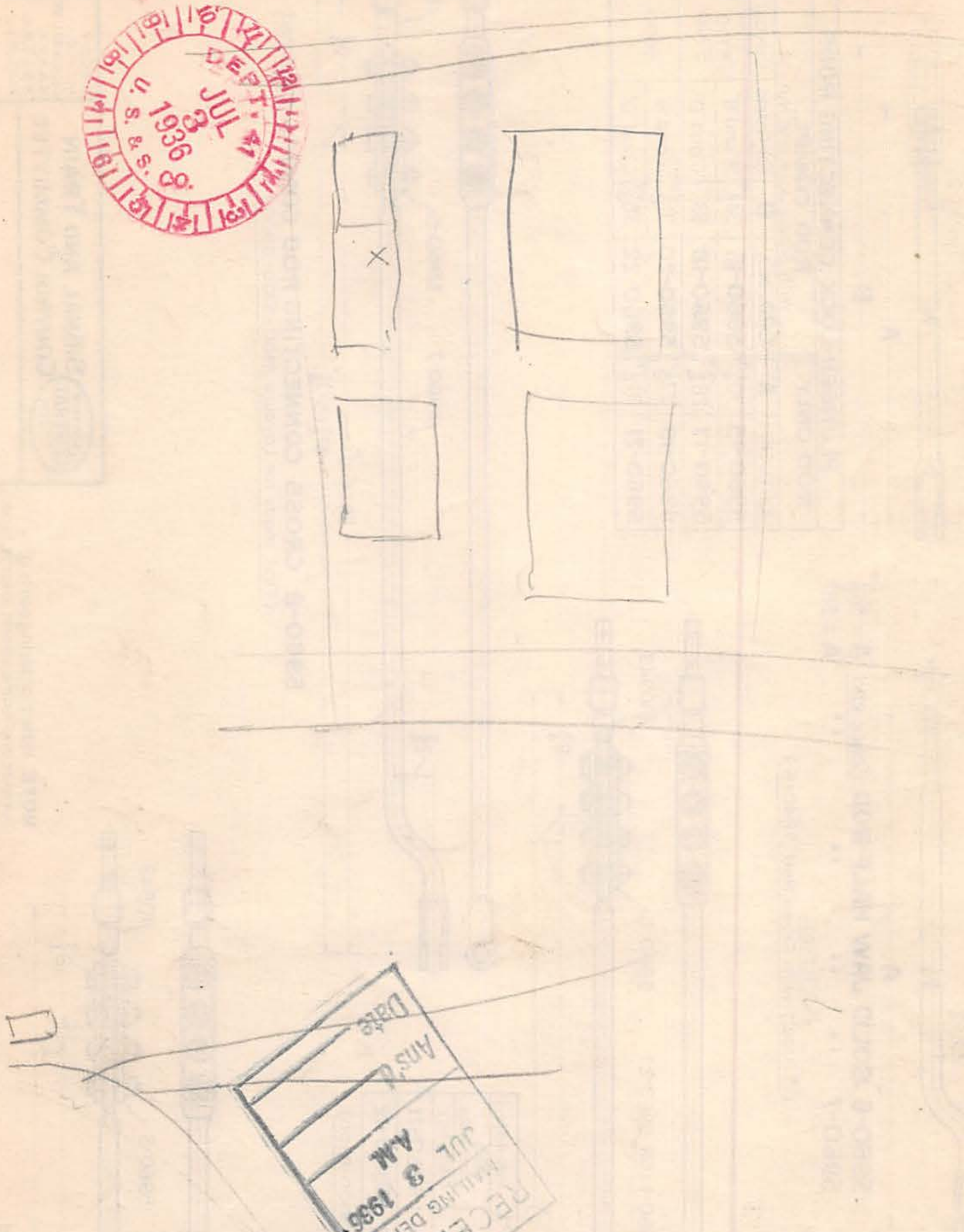
N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST L RY.
B.& A.R.R.
P. & L.E.R.R.
RUTL.R.R.

5960

ISSUE	DATE
3	2-15-1936

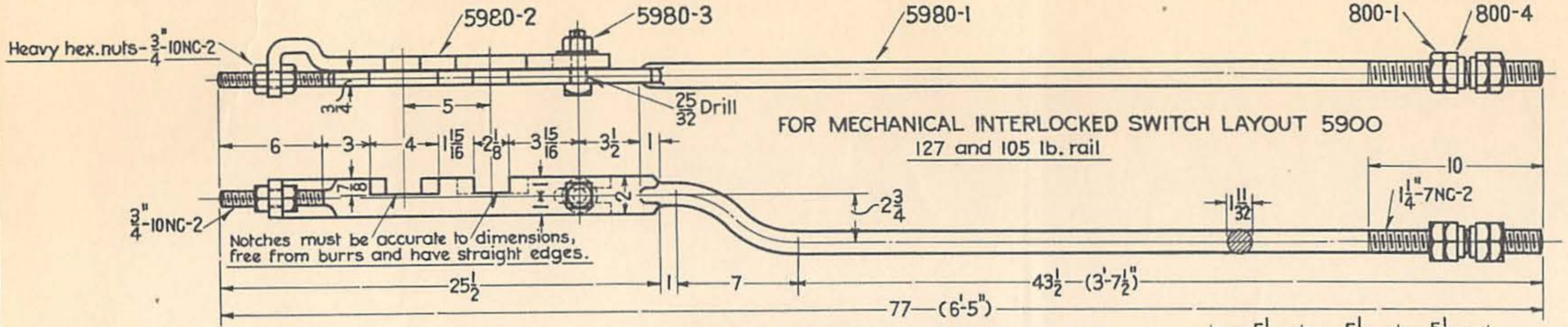
Approved by Representatives of Lines shown.
J.C. Mock
Chairman

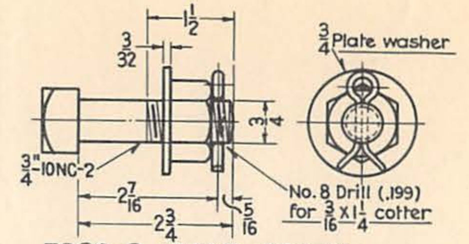
DEPT. 41
JUL
3
1936
U. S. & S. CO.



RECEIVED
MAILING DEPT.
JUL 3 1936
A.M.
Ans'd
Date

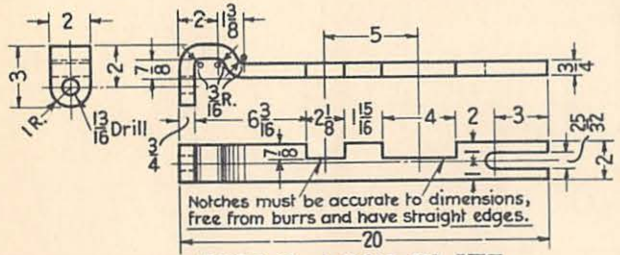
DEPT. 41
JUL
21
1936
U. S. & S. CO.


Heavy hex. nuts - 3/4"-10NC-2
5980-2
5980-3
5980-1
800-1
800-4
25/32 Drill
FOR MECHANICAL INTERLOCKED SWITCH LAYOUT 5900
127 and 105 lb. rail
6
3
4
1 15/16
2 1/8
3 15/16
3 1/2
1
5
3/4"-10NC-2
Notches must be accurate to dimensions, free from burrs and have straight edges.
2 3/4
11/32
10
1 1/4"-7NC-2
25 1/2
7
43 1/2 — (3'-7 1/2")
77 — (6'-5")


1 1/2
3/32
3/4 Plate washer
3/4
3/4"-10NC-2
2 7/16
2 3/4
5/16
No. 8 Drill (.199) for 3/16 x 1 1/4 cotter

5980-3 BOLT COMPL.

O. H. Steel – Am. Std. Heavy Head and Nut


2
2
1 3/8
5
3
1 R.
13/16 Drill
3/16 R.
7/8
3/4
6 3/16
2 1/8
1 15/16
4
2
3
25/32
Notches must be accurate to dimensions, free from burrs and have straight edges.
20

5980-2 LOCK PLATE

Forged Steel

5980-1 SWITCH LOCK ROD ONLY

Without Lock Plate, Adj. Nuts or Adj. Bolt

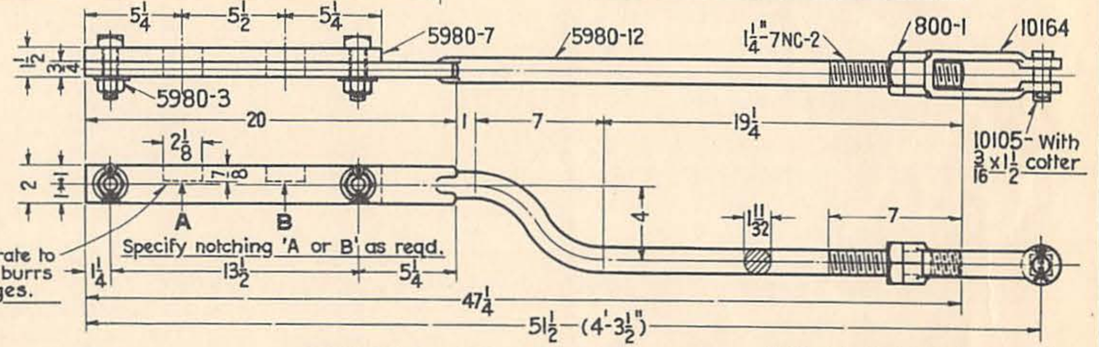
5980-4 SWITCH LOCK ROD ONLY

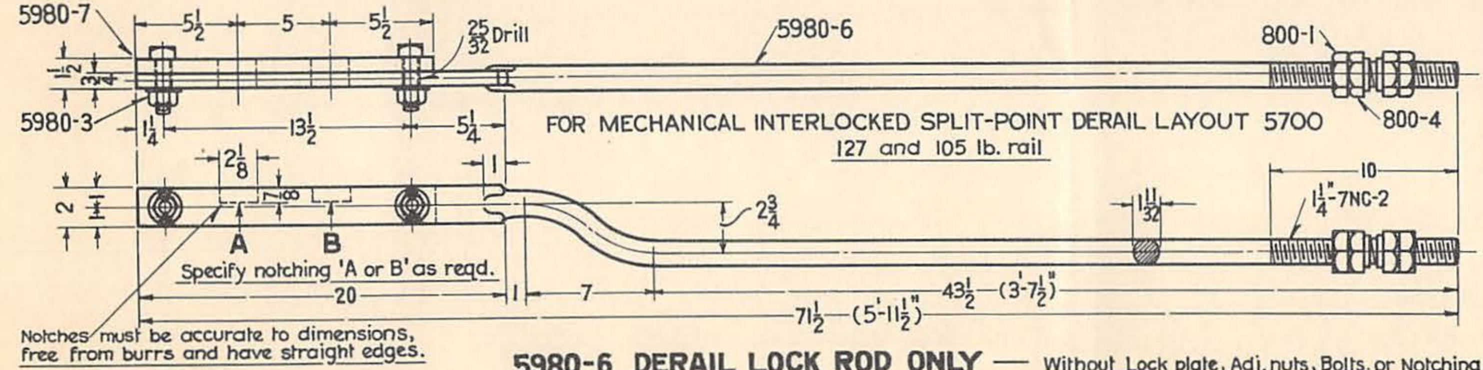
With Adj. Nuts and Adj. Bolt only

5980-5 SWITCH LOCK ROD COMPL.

With Lock Plate, Adj. Nuts and Bolt as shown

Forged Steel


5 1/4
5 1/2
5 1/4
5980-7
5980-12
1 1/4"-7NC-2
800-1
10164
5980-3
20
7
19 1/4
10105 - With 3/16 x 1 1/2 cotter
2 1/8
7/8
A
B
Specify notching 'A or B' as reqd.
Notches must be accurate to dimensions, free from burrs and have straight edges.
4
11/32
7
1 1/4
13 1/2
5 1/4
47 1/4
51 1/2 — (4'-3 1/2")


5980-7
5 1/2
5
5 1/2
25/32 Drill
5980-6
800-1
800-4
5980-3
1 1/4
13 1/2
5 1/4
FOR MECHANICAL INTERLOCKED SPLIT-POINT DERAIL LAYOUT 5700
127 and 105 lb. rail
2 1/8
7/8
1
10
2 3/4
11/32
1 1/4"-7NC-2
A
B
Specify notching 'A or B' as reqd.
20
7
43 1/2 — (3'-7 1/2")
71 1/2 — (5'-11 1/2")
Notches must be accurate to dimensions, free from burrs and have straight edges.

5980-12 DERAIL LOCK ROD ONLY – Without Lock plate, Bolts, Screw jaw, Nut, Jaw pin or Notching.
5980-13 " " " " – With Bolts, Screw jaw, Nut and Jaw pin – without Lock pl. or Notching.
5980-14 " " " **COMPL.** – As Shown – without Notching.
5980-15 " " " " – As Shown – with Notching – 'A'.
5980-16 " " " " – As Shown – with Notching – 'B'.

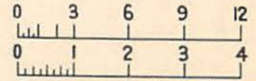
Forged Steel

FOR MECHANICAL INTERLOCKED HAYES DERAIL LAYOUT 5600

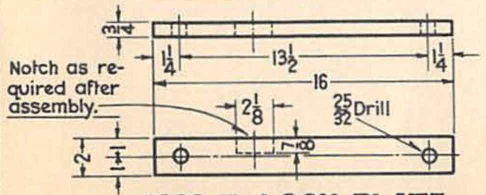
5980-6 DERAIL LOCK ROD ONLY — Without Lock plate, Adj. nuts, Bolts. or Notching.
5980-8 " " " " — With Adj. nuts and bolts – without Notching.
5980-9 " " " **COMPL.** — With Lock plate, Adj. nuts and bolts – without Notching.
5980-10 " " " " — As Shown – with Notching – 'A'.
5980-11 " " " " — As Shown – with Notching – 'B'.

Forged Steel

NOTE: When ordering parts give name and number shown in large type.


0
3
6
9
12
0
1
2
3
4

Scales: and dimensions given in inches


3/4
1 1/4
13 1/2
1 1/4
16
Notch as required after assembly.
2 1/8
25/32 Drill
7/8
2
1

5980-7 LOCK PLATE

O. H. Steel

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.
RUTL.R.R.

5980

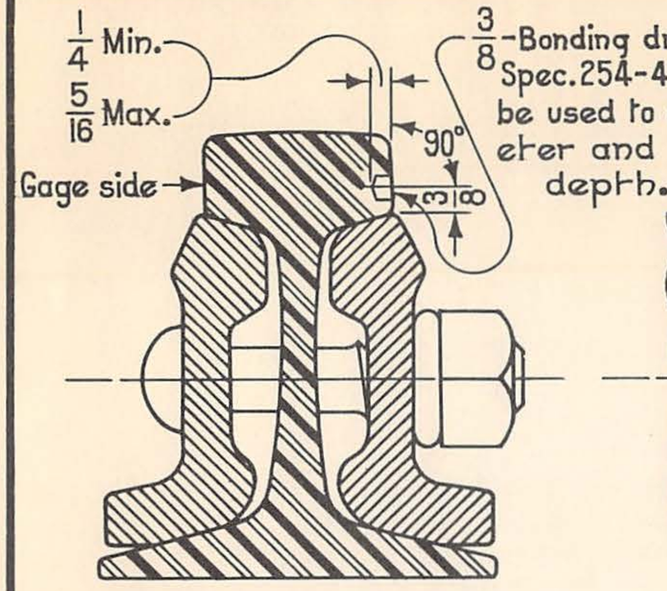
ISSUE	DATE
4	9-21-1936
5	7-10-1937

LOCK RODS

FOR MECHANICAL INTERLOCKED SWITCHES AND DERAILS

Approved by Representatives of Lines shown.

J.C. Mock
Chairman


1/4 Min.
5/16 Max.
3/8-Bonding drill-AAR Spec.254-49. Gage shall be used to check diameter and depth.
90°
3/8
Gage side

SECTION A-A

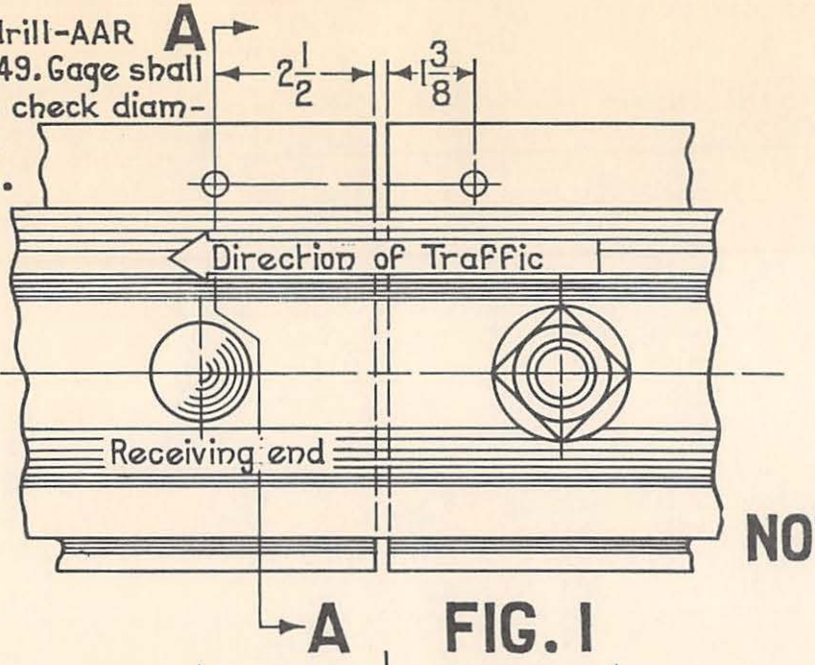

A
2 1/2
1 3/8
Direction of Traffic
Receiving end
A

FIG. 1

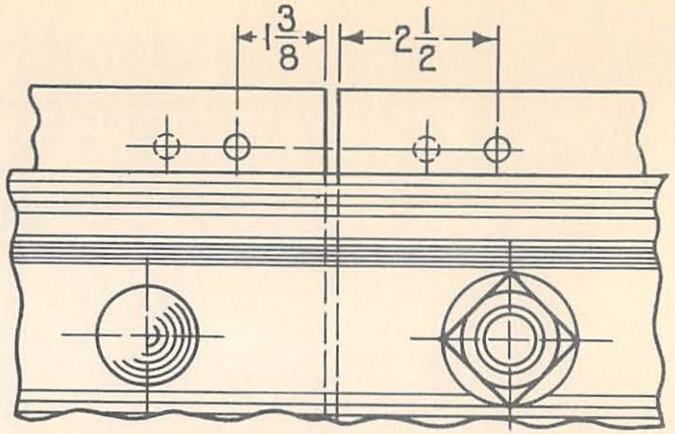
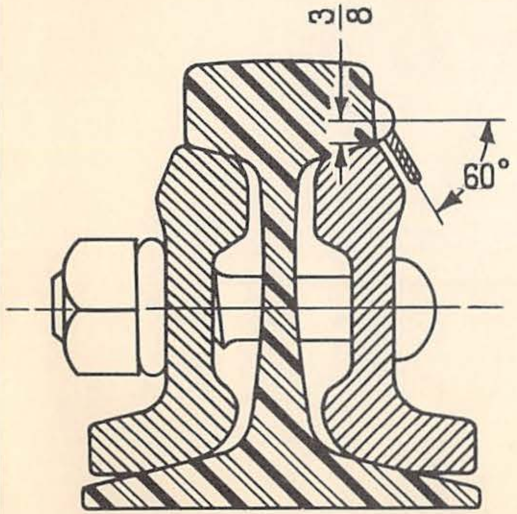


FIG. 2



SECTION B-B

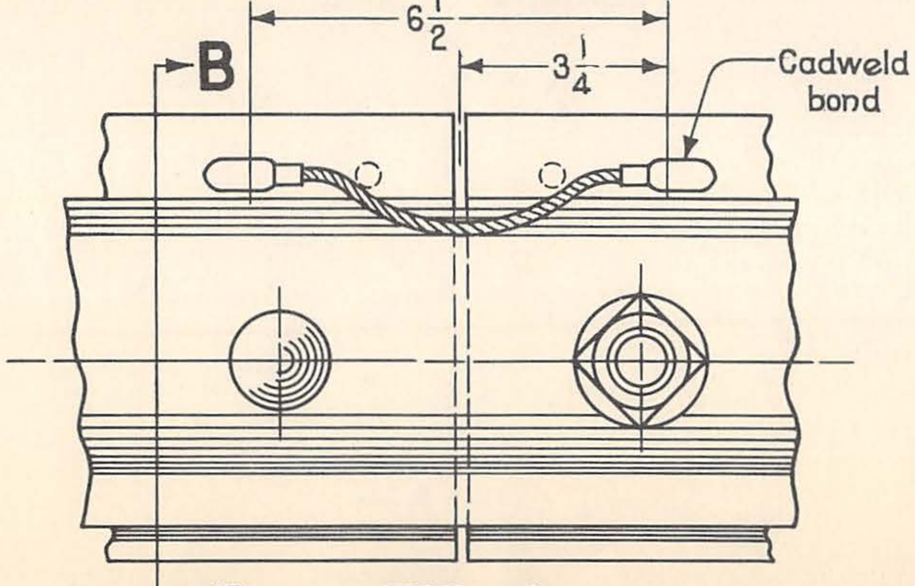

6 1/2
3 1/4
B
Cadweld bond
B

FIG. 3

NOTES:

1. Fig. 1 1st. Application
   " 2 2nd. "
   " 3 3rd. "
2. See N.Y.C.S., S.&T.C. Instructions 36 for General Bonding Instructions.
3. Limitations shown apply to all weights of rail.
4. Drilling and dimensions based on Engineering Committee Plan EC G-25.

0 1 2 3 6 inches.

All dimensions given in inches

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&St.L.Ry.
B.&A.R.R.
P.&L.E.R.R.

6083C

3-29-1937
11-4-1943
8-2-1950

RAIL-HEAD SIGNAL BONDS

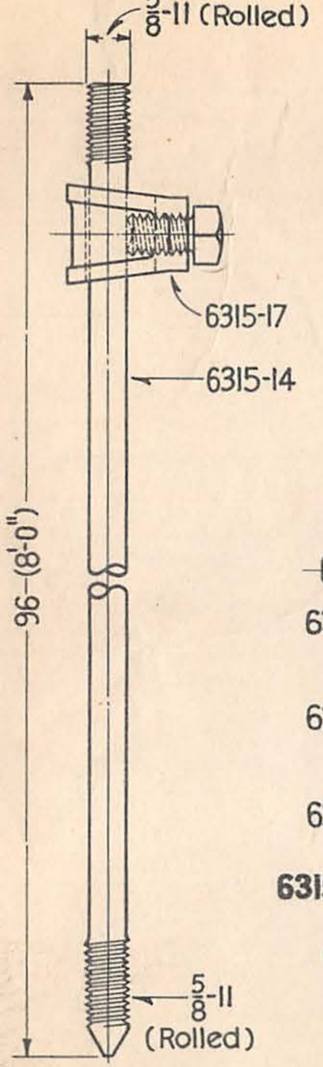
DRILLING AND APPLICATION

Approved by Representatives of lines shown.

Chairman.

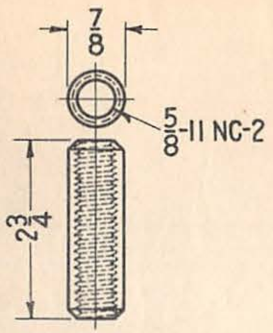
Printed in U.S.A.

6315A
Supersedes NYC-W S-X13A and rod on 2318-A of Sys. Com.



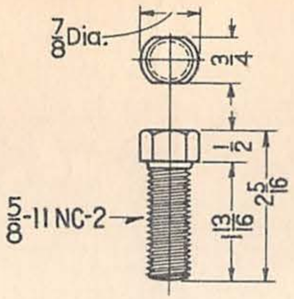
5/8-11 (Rolled)
96-(8'-0")
6315-17
6315-14
5/8-11 (Rolled)

6315-14 SECTIONAL GROUND ROD ONLY (Copperweld Co., 29438 or equal)
6315-2 " " " COMPL. (With clamp 6315-17)



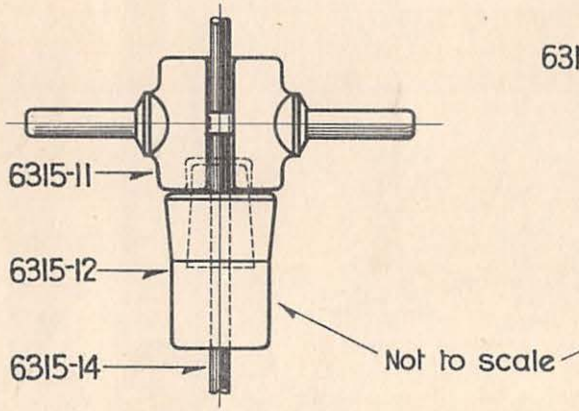
7/8
5/8-11 NC-2
2 3/4

6315-15 COUPLING
{Copperweld Co., 9534 or equal}



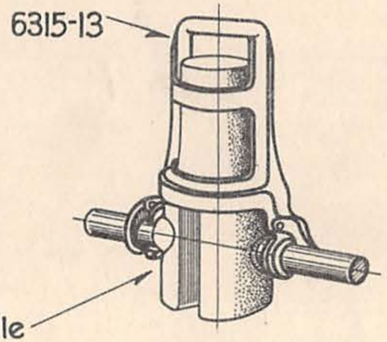
7/8 Dia.
3/4
1/2
5/8-11 NC-2
1 13/16
2 5/16

6315-16
DRIVING STUD
Steel
{Hubbard & Co., 29534 or equal}

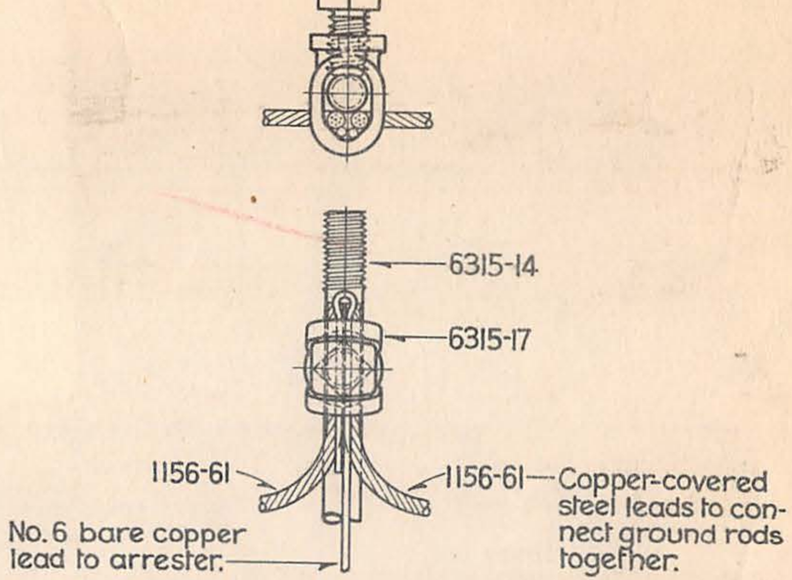


6315-11
6315-12
6315-14
Not to scale

6315-1 DRIVER COMPL.-Without rod.
6315-11 HAMMER ONLY
(Hubbard & Co., 21221 or equal)
6315-12 CHUCK ONLY
(Hubbard & Co., 21225 or equal)

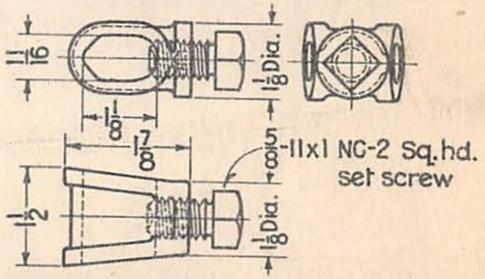


6315-13
CARRIER ONLY
(Hubbard & Co., 21228 or equal)
Hammer and Chuck assembled for carrying.



6315-14
6315-17
1156-61
1156-61
Copper-covered steel leads to connect ground rods together.
No. 6 bare copper lead to arrester.

GROUND ROD CONNECTION



11/16
1 1/8 Dia.
1 1/8
1 7/8
5/8-11x1 NC-2 Sq. hd. set screw
1 1/2
1 1/8 Dia.

6315-17 CLAMP COMPL. With set screw
(Copperweld Co., 9592 or equal)

NOTES:

Lightning arrester grounds, see Instruction 256.

Protective treatment shall be in accordance with Instruction 350.

0 1 2 3 4 5 6
Scale & all dimensions given in inches

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

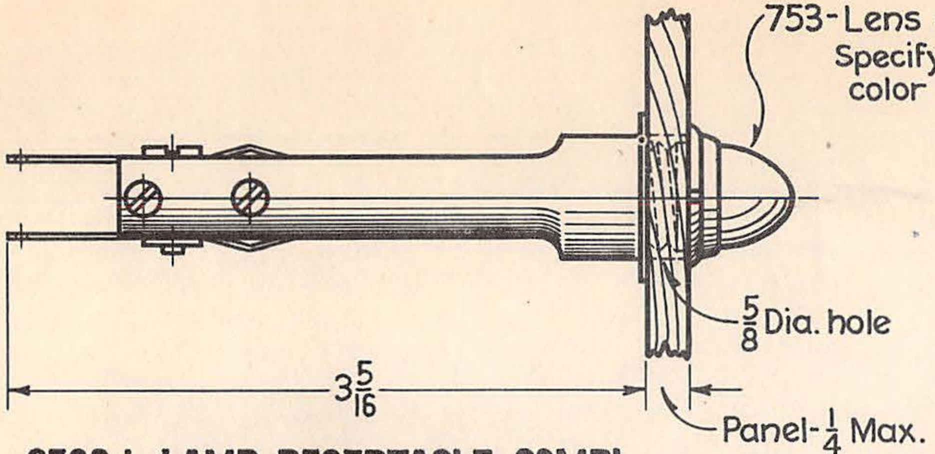
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.& A.R.R.
P.& L.E.R.R.

6315A
5-22-1945

SECTIONAL GROUND ROD

Approved by Representatives of Lines shown.
J. J. Corcoran
Chairman

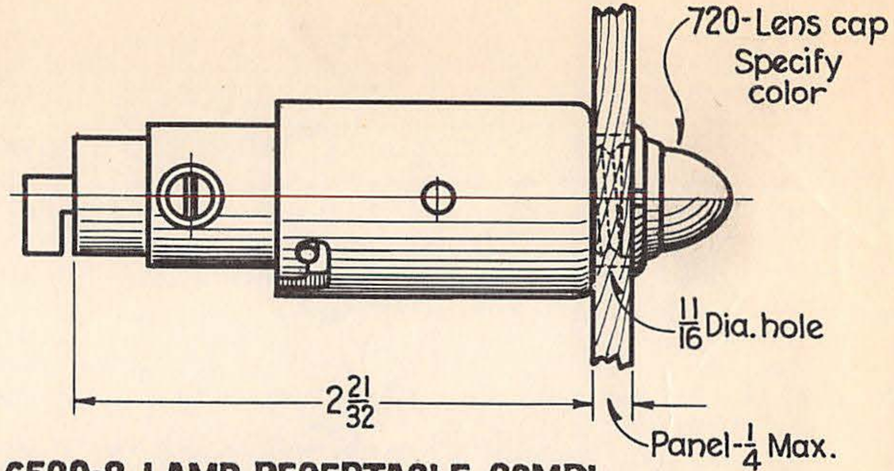
awt


753-Lens cap
Specify color
5/8 Dia. hole
3 5/16
Panel-1/4 Max.

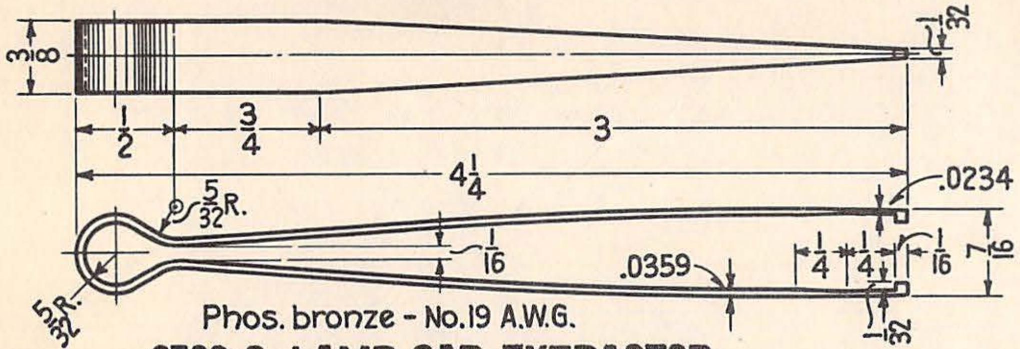
6500-1 LAMP RECEPTACLE COMPL.
Raco No. 749 or equal

COLORS OF LENS CAPS

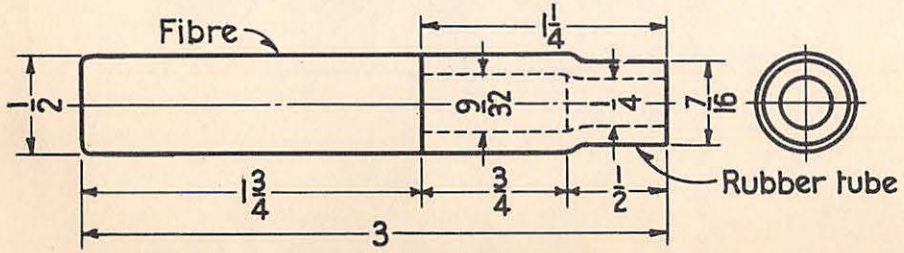
RED
OPAL
BLUE
GREEN
AMBER


720-Lens cap
Specify color
11/16 Dia. hole
2 21/32
Panel-1/4 Max.

6500-2 LAMP RECEPTACLE COMPL.
Raco No. 715-2 or equal
(Single contact)


3/8
1/32
1/2
3/4
3
4 1/4
.0234
5/32 R.
1/16
.0359
1/4
1/4
1/16
7/16
5/32 R.
1/32
Phos. bronze - No. 19 A.W.G.

6500-3 LAMP CAP EXTRACTOR


Fibre
1 1/4
1/2
9/32
1/4
7/16
1 3/4
3/4
1/2
3
Rubber tube

6500-4 BULB EXTRACTOR

Scale: Full
All dimensions given in inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

6500

10-8-1941

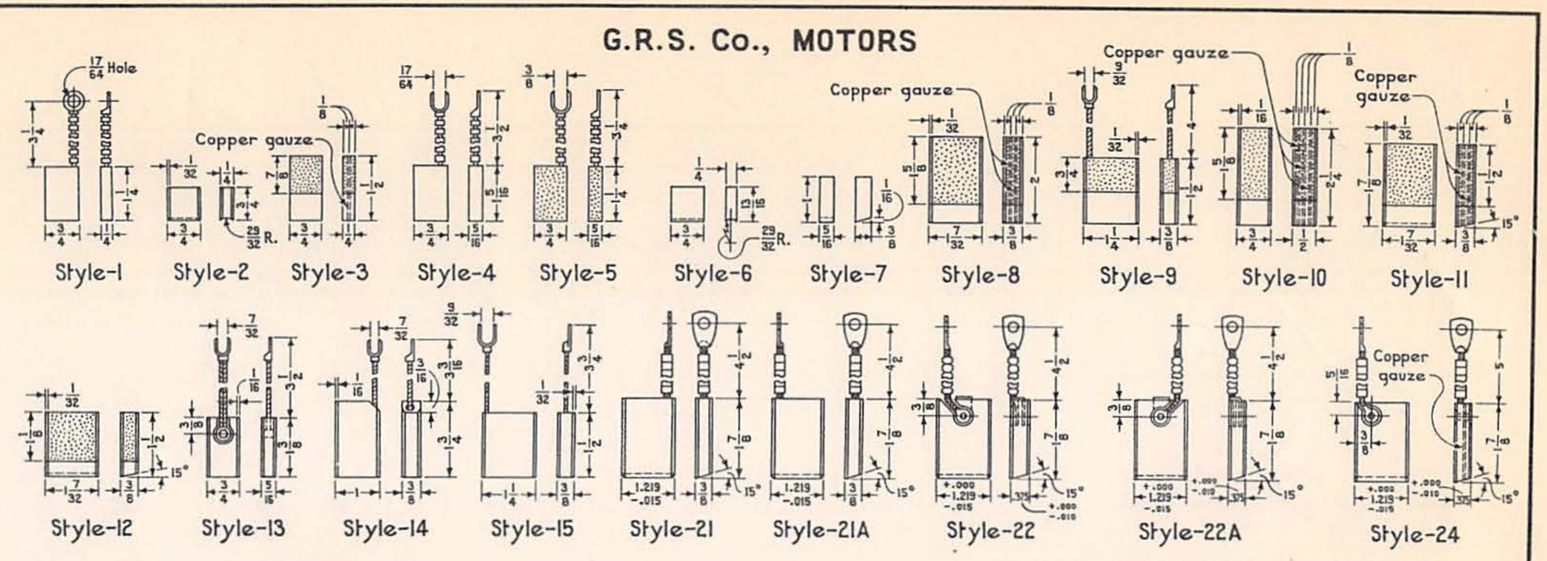
LAMP RECEPTACLES

FOR INDICATORS
AND TRACK CHARTS

Approved by Representatives of Lines shown.
J. Corcoran
Chairman

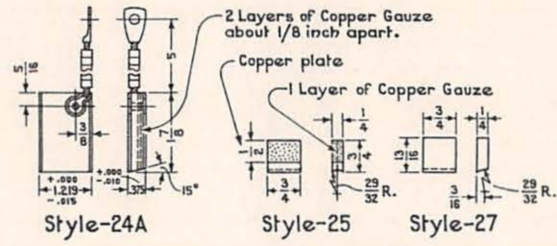
	TYPE OF MOTOR	FOR	STYLE	ORDER NO.	NAME	GRADE
G.R.S. Co.	Model 2A-10V. D.C.	Signal	1	6580-1	N.C. Co.	NJ-25
	" "-" "	"	2	6580-2	" " "	DO
	" "-" "	Xing.Gate	6	6580-9	" " "	"
	" 5A-B-C and D-20V. D.C.	Switch	2	6580-3	" " "	NJ-25
	" " "-" " "-" "	"	21	LH-6580-17	" " "	"-"
	" " "-" " "-" "	"	21A	RH-6580-17		
	Type B car retarder-110-220V. D.C.	Skate	2	6580-4	" " "	549
	" " " " -110V. D.C.	"	25	6580-5	" " "	"
	Model 2A-110V. D.C.	Signal	3	6580-6	" " "	"
	" "-" "	"	25	6580-18	" " "	"
	Type 4-20V. D.C. (Federal)	"	4	6580-7	" " "	524
	" "-110V. D.C.(")	"	5	6580-8	" " "	"
	Special-" " dwarf-(Federal)	"	7	6580-10	" " "	"
	Model 2 and 5-110V. D.C.	Switch	8	6580-11	" " "	549
	Type 2-4 and 41-110V. D.C.(Federal)	"	9	6580-12	" " "	306
	" 4 and 41-110V. D.C. (Federal)	"	15	6580-20	" " "	AY
	Model 4-4A-B and C-110V. D.C.	"	10	6580-13	" " "	549
	" 5A-B-C and D-110V. D.C.	"	11	6580-14	" " "	"
	" "-220V. D.C.	"	12	6580-15	" " "	"
	" "-B-C-D, 110V. D.C. SA Brake	"	21	LH-6580-20	" " "	NJ-25
	" "-"-"-", " " " "	"	21A	RH-6580-20		
	" "-C-D, 110V. D.C. QA Brake	"	22	LH-6580-23	" " "	850
	" " " " " " " "	"	22A	RH-6580-23		
	" " and B, 110V. D.C.	"	24	LH-6580-27	" " "	549
	" " " ", " "	"	24A	RH-6580-27		
	" 6, 110V. D.C.	"	24	LH-6580-29	" " "	"
	" ", " "	"	24A	RH-6580-29		
	Type B car retarder-230V. D.C.	Mechan'm.	13	6580-16	" " "	SA-35 or 259
					" " "	25903
					G.E. Co.	G
					" "	D-3 or 377
	Type B car retarder-230V. D.C. compound wound	Mechan'm.	14	6580-19	Westinghouse	WL-21
	" " crossing gate L.V.D.C.	Xing. Gate	27	6580-28	N.C. Co.	DO
U.S.&S. Co.	Style B-10V. D.C.	Signal	16	6580-21	N.C. Co.	NJ-15
	" " and S-10V. D.C.	"	17	LH-6580-22	" " "	EL
	" " " "-" "	"	17A	RH-6580-22		
	" "-10V. D.C	"	18	6580-24	U.S.& S. Co.	Pc.74289
	" K-" " (Hall)	"	19	6580-25	N.C. Co.	NJ-25
	" L-" " (")	"	20	6580-26	" " "	"-"
	" T-2-10V. D.C.	"	23	6580-30	" " "	"-"
	" M and M-2-110V. D.C., or A.C.	Switch	26	6580-34	Stackpole	C-1
	" " " M-20-32V. D.C.	"	26A	6580-35	"	P-85
	Type No. 3564 crossing gate mech.	Xing. Gate	32	6580-36	N.C. Co.	DO
					1.55252	
MISCL.	Model 5D74AB8 (G.E. Dynamotor)	Power	28	6580-31	G.E. Co.	258 A.C.
	" 5H76AB1A (" ")	"	29	6580-32	" "	9613 D.C.
	" 5R21U Kohler Plant	"	30	6580-33	Kohler	D-742 D.C.
	" " " "	"	31	6580-34	"	156031 A.C.

G.R.S. Co., MOTORS



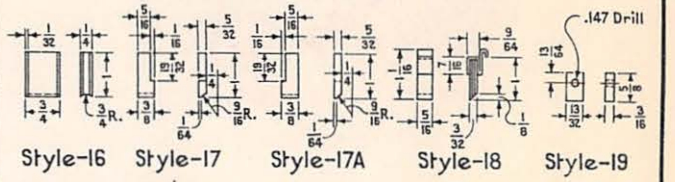
Style-1 Style-2 Style-3 Style-4 Style-5 Style-6 Style-7 Style-8 Style-9 Style-10 Style-11

Style-12 Style-13 Style-14 Style-15 Style-21 Style-21A Style-22 Style-22A Style-24

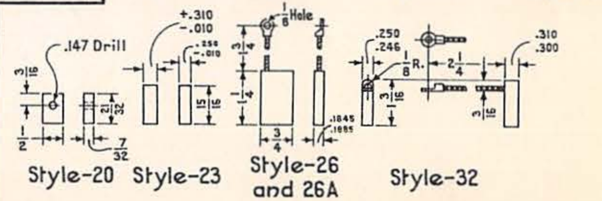


Style-24A Style-25 Style-27

U.S.&S. Co., MOTORS



Style-16 Style-17 Style-17A Style-18 Style-19

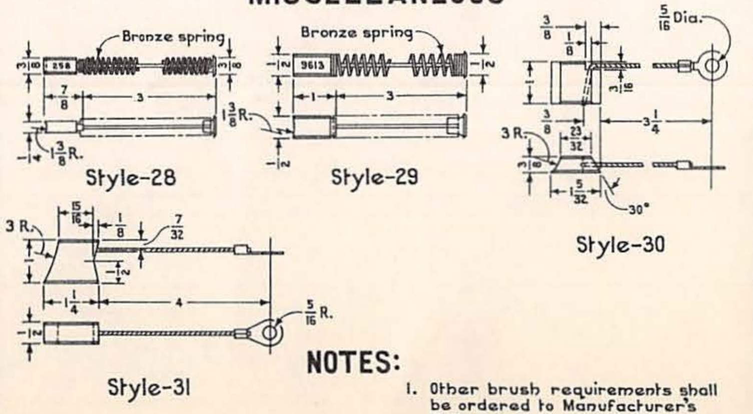


Style-20 Style-23 Style-26 and 26A Style-32

0 1 2 3 4 5 6 inches.

All dimensions given in inches

MISCELLANEOUS



Style-28 Style-29 Style-30 Style-31

NOTES:

1. Other brush requirements shall be ordered to Manufacturer's Reference.

▨ = Copper plated brushes.

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

6580B

7-21-1944
3-21-1952

MOTOR BRUSHES

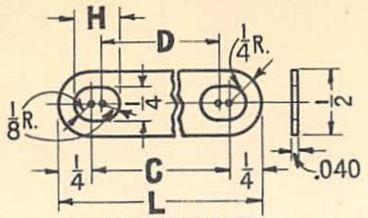
Approved by Representatives of Lines shown.

J J Corcoran

Chairman.

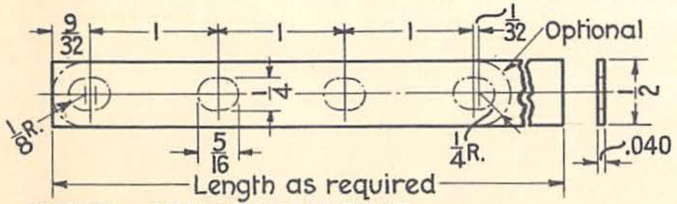
Printed in U.S.A.

RECEIVED
APR 3 1953
ORD. INTER. SECT.

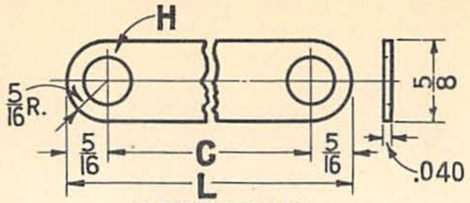

H
D
$\frac{1}{4}$R.
$\frac{1}{8}$R.
$\frac{1}{4}$
$\frac{1}{2}$
$\frac{1}{4}$
C
$\frac{1}{4}$
.040
L

CONNECTOR

ORDER No.	L	POST CENTERS NOMINAL	POST CENTERS C	POST CENTERS D	H	USE
10763	$1\frac{9}{16}$	1	$1\frac{1}{16}$	$\frac{15}{16}$	$\frac{5}{16}$	AAR-10568-10569-105610
6860-11	$1\frac{3}{4}$	$1\frac{1}{4}$ OR $\frac{7}{8}$	$1\frac{1}{4}$	$\frac{7}{8}$	$\frac{7}{16}$	Coupling-GRS Type 'K' neut. relay
6860-12	$1\frac{11}{16}$	$1\frac{1}{8}$	$1\frac{3}{16}$	$1\frac{1}{16}$	$\frac{5}{16}$	L.V. cont.-GRS Mod. 5 int. mach. GRS Type 'K' relay cont. posts Relay contact posts
6860-13	$1\frac{13}{16}$	$1\frac{1}{4}$	$1\frac{5}{16}$	$1\frac{3}{16}$	$\frac{5}{16}$	Terminals and resistances
6860-14	$1\frac{15}{16}$	$1\frac{3}{8}$	$1\frac{7}{16}$	$1\frac{5}{16}$	$\frac{5}{16}$	Tapet cir. cont.-Mech. mach.
6860-15	$2\frac{1}{16}$	$1\frac{1}{2}$	$1\frac{9}{16}$	$1\frac{7}{16}$	$\frac{5}{16}$	Terminals and resistances
6860-16	$2\frac{1}{4}$	$1\frac{3}{4}$ OR $1\frac{3}{16}$	$1\frac{3}{4}$	$1\frac{3}{16}$	$\frac{17}{32}$	Everett Type RU-1 track resist.
6860-17	$2\frac{7}{16}$	$1\frac{7}{8}$	$1\frac{15}{16}$	$1\frac{13}{16}$	$\frac{5}{16}$	Old terminal block-NYCS 2650-11
6860-18	$2\frac{9}{16}$	2	$2\frac{1}{16}$	$1\frac{15}{16}$	$\frac{5}{16}$	Various
10764	$2\frac{15}{16}$	$2\frac{3}{8}$	$2\frac{7}{16}$	$2\frac{5}{16}$	$\frac{5}{16}$	AAR-105611-105612-105613
6860-19	$3\frac{9}{16}$	3	$3\frac{1}{16}$	$2\frac{15}{16}$	$\frac{5}{16}$	NX-Interlocking mach.-MCRR

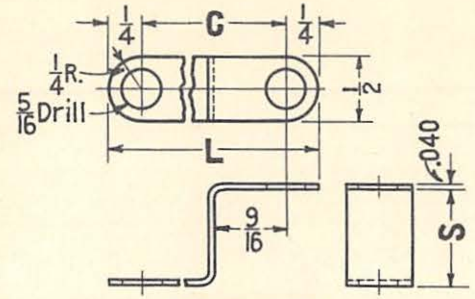

$\frac{9}{32}$
1
1
1
$\frac{1}{32}$ Optional
$\frac{1}{4}$
$\frac{1}{2}$
$\frac{1}{8}$R.
$\frac{5}{16}$
$\frac{1}{4}$R.
.040
Length as required

10765 CONNECTOR BUS-Blank.
10766 " " -With holes as shown.
(Approx'ly 17 ft. per pound-blank)


H
$\frac{5}{16}$R.
$\frac{5}{8}$
$\frac{5}{16}$
C
$\frac{5}{16}$
.040
L

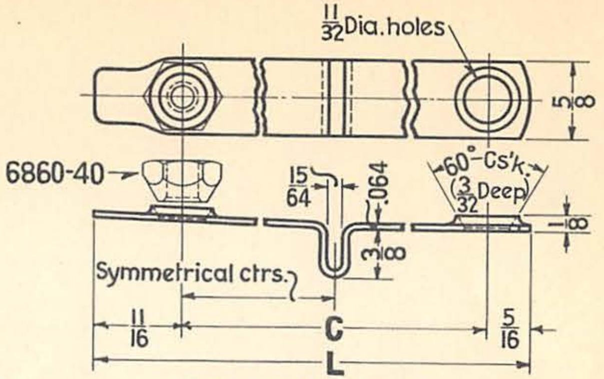
CONNECTOR

ORDER No.	L	C	H	USE
6860-21	$1\frac{7}{8}$	$1\frac{1}{4}$	$\frac{5}{16}$	GRS Mod. 5 switch cir. cont'r.
6860-22	2	$1\frac{3}{8}$	$\frac{3}{8}$	Hall switch cir. cont'r.
6860-23	$2\frac{3}{16}$	$1\frac{9}{16}$	$\frac{3}{8}$	GRS Mod. 7 switch cir. cont'r.


$\frac{1}{4}$
C
$\frac{1}{4}$
$\frac{1}{4}$R.
$\frac{5}{16}$Drill
$\frac{1}{2}$
L
.040
$\frac{9}{16}$
S

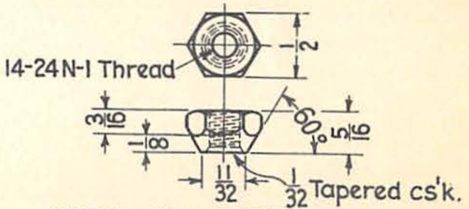
CONNECTOR

ORDER No.	L	C	S	DEV'D L'GTH.	USE
6860-31	$1\frac{1}{2}$	1	$\frac{3}{4}$	$2\frac{1}{4}$	GRS 'K' relay contact posts
6860-32	$1\frac{5}{8}$	$1\frac{1}{8}$	$\frac{11}{16}$	$2\frac{5}{16}$	Hall 'H' relay contact posts
6860-33	$1\frac{5}{8}$	$1\frac{1}{8}$	1	$2\frac{5}{8}$	GRS '9E' relay contact posts


$\frac{11}{32}$Dia. holes
$\frac{5}{8}$
6860-40
$\frac{15}{64}$
.064
60° Cs'k.
($\frac{3}{32}$ Deep)
$\frac{1}{8}$
$\frac{3}{8}$
Symmetrical ctrs.
$\frac{11}{16}$
C
$\frac{5}{16}$
L

TESTING LINK

LINK COMPL. With two cone nuts	LINK ONLY Without cone nuts	L	C	RACO REFERENCE OR EQUAL	
ORDER No's				Link compl. with 2 cone nuts 869	Link only
6860-41	6860-42	2	1	865	871
6860-43	6860-44	$3\frac{3}{8}$	$2\frac{3}{8}$	867	872


14-24N-1 Thread
$\frac{1}{2}$
$\frac{3}{16}$
$\frac{1}{8}$
60°
$\frac{5}{16}$
$\frac{11}{32}$
$\frac{1}{32}$ Tapered cs'k.

6860-40 CONE NUT
(Raco 869 or equal)

NOTE:
Connectors, connector busses and testing links shall be half-hard copper, nickel plated.
Cone nuts to be brass, nickel plated.

0 1 2 3
Scale and all dimensions given in inches

NEW YORK CENTRAL SYSTEM **SIGNAL AND TRAIN CONTROL COMMITTEE**

TERMINAL CONNECTORS
AND
TESTING LINKS

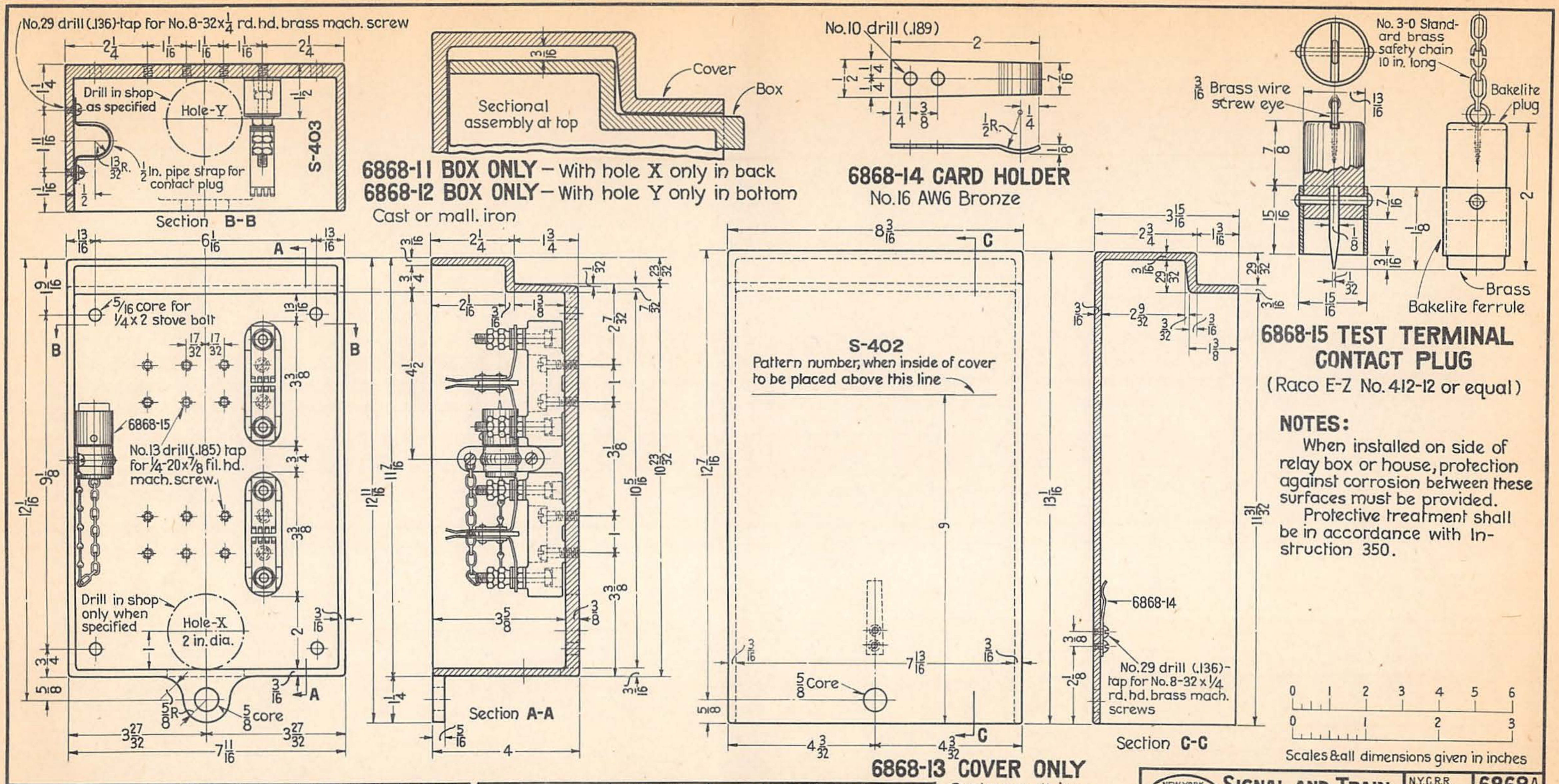
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

6860A
4-29-1946

Approved by Representatives of Lines shown.
JJCorcoran
Chairman

(Printed in U.S.A.)

Plan 6868A supersedes N.Y.C.R.R. Plan No. S-T2F.


No.29 drill (.136)-tap for No.8-32x¼ rd.hd. brass mach. screw
Drill in shop as specified
Hole-Y
S-403
13/32 R.
½ In. pipe strap for contact plug
Section B-B
Sectional assembly at top
Cover
Box
No.10 drill (.189)
½R.
A
B
5/16 core for ¼x2 stove bolt
6868-15
No.13 drill (.185) tap for ¼-20x⅞ fil. hd. mach. screw.
Drill in shop only when specified
Hole-X
2 in. dia.
⅝R.
⅝ core
Section A-A
C
S-402
Pattern number, when inside of cover to be placed above this line
⅝ Core
Section C-C
6868-14
No.29 drill (.136)-tap for No.8-32x¼ rd.hd. brass mach. screws
No. 3-0 Standard brass safety chain 10 in. long
3/16 Brass wire screw eye
Bakelite plug
Brass
Bakelite ferrule
0 1 2 3 4 5 6
0 1 2 3

6868-11 BOX ONLY – With hole X only in back
6868-12 BOX ONLY – With hole Y only in bottom
Cast or mall. iron

6868-14 CARD HOLDER
No.16 AWG Bronze

6868-15 TEST TERMINAL CONTACT PLUG
(Raco E-Z No. 412-12 or equal)

NOTES:

When installed on side of relay box or house, protection against corrosion between these surfaces must be provided.

Protective treatment shall be in accordance with Instruction 350.

6868-13 COVER ONLY
Cast or mall. iron

Scales & all dimensions given in inches

TEST BOX COMPL.	BOX ONLY REF. NO.	BOX ONLY HOLE	COVER	TEST TERMINALS NO. OF	TEST TERMINALS REF. NO.	CONTACT PLUG COMP.
6868-1	6868-11	X	6868-13	2		6868-15
6868-2	6868-12	Y	6868-13	2		6868-15
6868-3	6868-11	X	6868-13	4		6868-15
6868-4	6868-12	Y	6868-13	4		6868-15
6868-5	6868-11	X	6868-13	6		6868-15
6868-6	6868-12	Y	6868-13	6		6868-15
6868-7	6868-11	X	6868-13	8		6868-15
6868-8	6868-12	Y	6868-13	8		6868-15

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

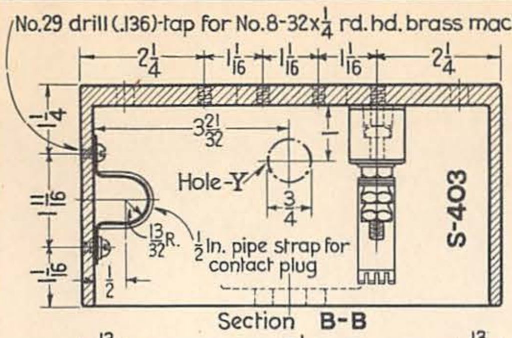
N.Y.C.R.R.
M.C.R.R.
C.C.C.&STL.RY.
B.&A.R.R.
P.&L.E.R.R.
RUTL.R.R.

6868A
7-23-1942

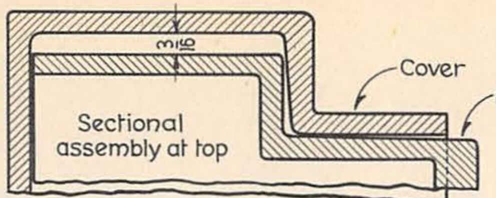
TEST BOX
FOR HIGHWAY CROSSING SIGNALS

Approved by Representives of Lines shown.
Chairman

Plan 6868A supersedes N.Y.C.R.R. Plan No. S-T2F.



No.29 drill (.136)-tap for No.8-32x1/4 rd.hd. brass mach. screw
2 1/4
1 1/16
1 1/16
1 1/16
2 1/4
1 1/4
3 21/32
Hole-Y
3/4
1 11/16
13/32 R.
1/2 In. pipe strap for contact plug
1 1/16
1/2
S-403
Section B-B

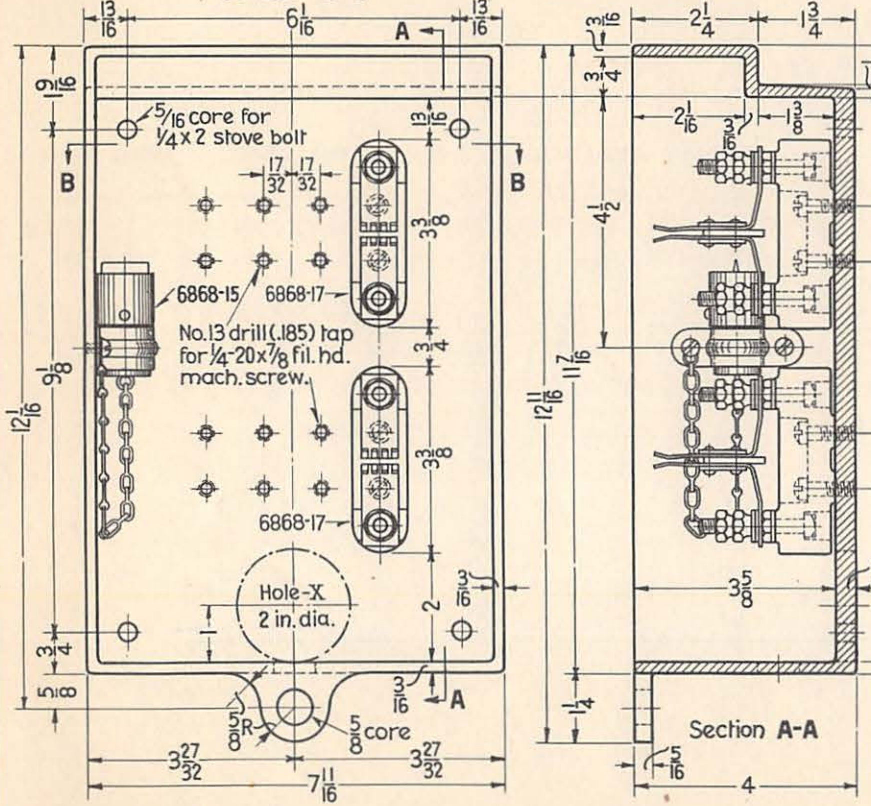


3/16
Cover
Box
Sectional assembly at top

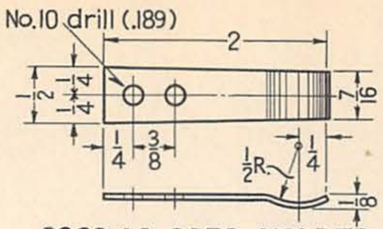
6868-11 BOX ONLY – With hole X only in back

6868-12 BOX ONLY – With hole Y only in bottom

Cast or mall. iron



13/16
6 1/16
13/16
A
9/16
1 9/16
5/16 core for 1/4 x 2 stove bolt
13/16
B
17/32
17/32
B
3 3/8
6868-15
6868-17
No.13 drill (.185) tap for 1/4-20x7/8 fil.hd. mach. screw.
3 1/4
9 5/8
12 1/16
3 3/8
6868-17
Hole-X 2 in. dia.
1
2
3/16
3/4
5/8
5/8 R.
5/8 core
3/16
A
3 27/32
3 27/32
7 11/16
3/16
2 1/4
1 3/4
3/4
1/32
2 1/16
3/16
1 3/8
4 1/2
11 7/16
12 11/16
23/32
2 7/32
7/32
1
3 1/8
10 5/16
10 23/32
1
3 3/8
3 5/8
3/8
1 1/4
3/16
Section A-A
5/16
4



No.10 drill (.189)
2
1/2
1/4
1/4
7/16
1/4
3/8
1/2 R.
1/4
1/8

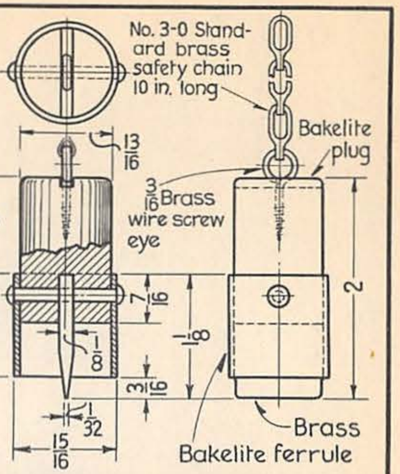
6868-14 CARD HOLDER

No.16 AWG Bronze

NOTES:

When installed on side of relay box or house, protection against corrosion between these surfaces must be provided.

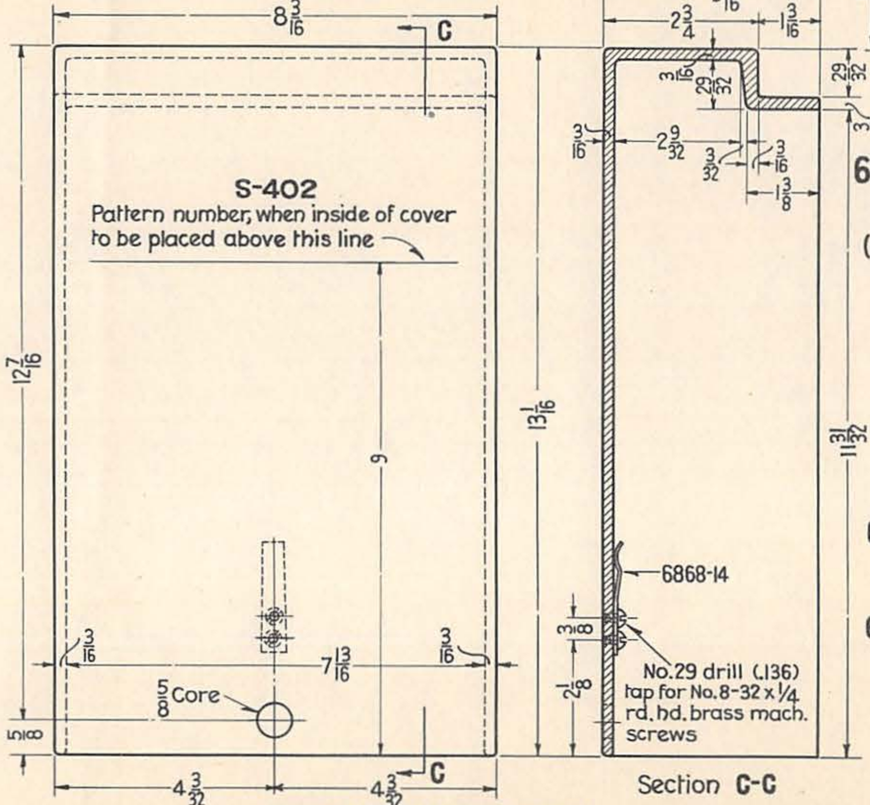
Protective treatment shall be in accordance with Instruction 350.



No. 3-0 Standard brass safety chain 10 in. long
Bakelite plug
13/16
3/16 Brass wire screw eye
7/8
7/16
1 1/8
2
1/8
5/16
3/16
1/32
15/16
Brass
Bakelite ferrule

6868-15 TEST TERMINAL CONTACT PLUG

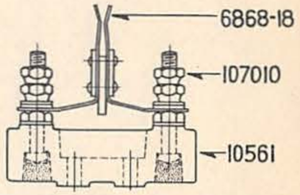
(Raco E-Z No. 412-12 or equal)



8 3/16
C
S-402
Pattern number, when inside of cover to be placed above this line
12 7/16
13 1/16
9
3/16
7 13/16
3/16
5/8 Core
5/8
4 3/32
4 3/32
C
3 15/16
2 3/4
1 3/16
3/16
29/32
2 9/32
3/32
3/16
1 3/8
29/32
3/16
3/16
6868-14
3/8
2 1/8
No.29 drill (.136) tap for No.8-32 x 1/4 rd.hd. brass mach. screws
11 31/32
Section C-C

6868-13 COVER ONLY

Cast or mall. iron



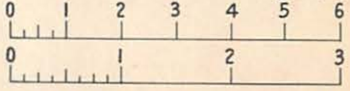
6868-18
107010
10561

6868-17 OPEN CIRCUIT TEST TERMINAL COMPLETE – AS SHOWN

(Raco E-Z No.727 or equal)

6868-18 OPEN CIRCUIT TEST TERMINAL ONLY – WITHOUT BASE OR POSTS

(Raco E-Z No.728 or equal)



0
1
2
3
4
5
6
0
1
2
3

Scales & all dimensions given in inches

TEST BOX COMPL.	BOX ONLY		COVER	TEST TERMINALS		CONTACT
	REF. NO.	HOLE		NO. OF	REF. NO.	PLUG COMP.
6868-1	6868-11	X	6868-13	2	6868-17	6868-15
6868-2	6868-12	Y	6868-13	2	6868-17	6868-15
6868-3	6868-11	X	6868-13	4	6868-17	6868-15
6868-4	6868-12	Y	6868-13	4	6868-17	6868-15
6868-5	6868-11	X	6868-13	6	6868-17	6868-15
6868-6	6868-12	Y	6868-13	6	6868-17	6868-15
6868-7	6868-11	X	6868-13	8	6868-17	6868-15
6868-8	6868-12	Y	6868-13	8	6868-17	6868-15

NEW YORK CENTRAL SYSTEM

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

6868B

7-23-1942
4-12-1943

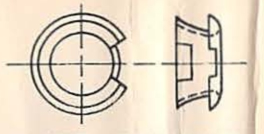
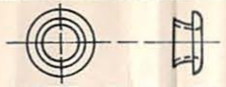
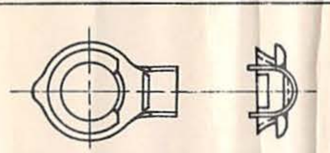
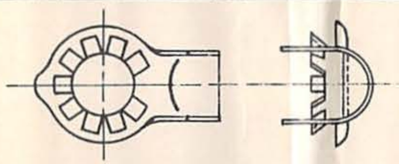
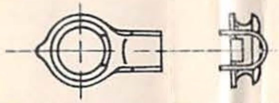
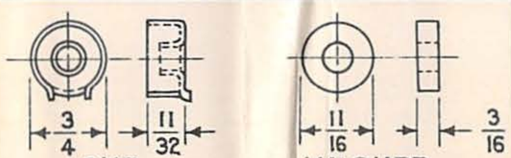
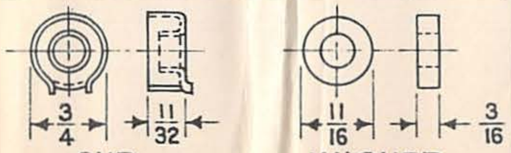
TEST BOX

FOR HIGHWAY CROSSING SIGNALS

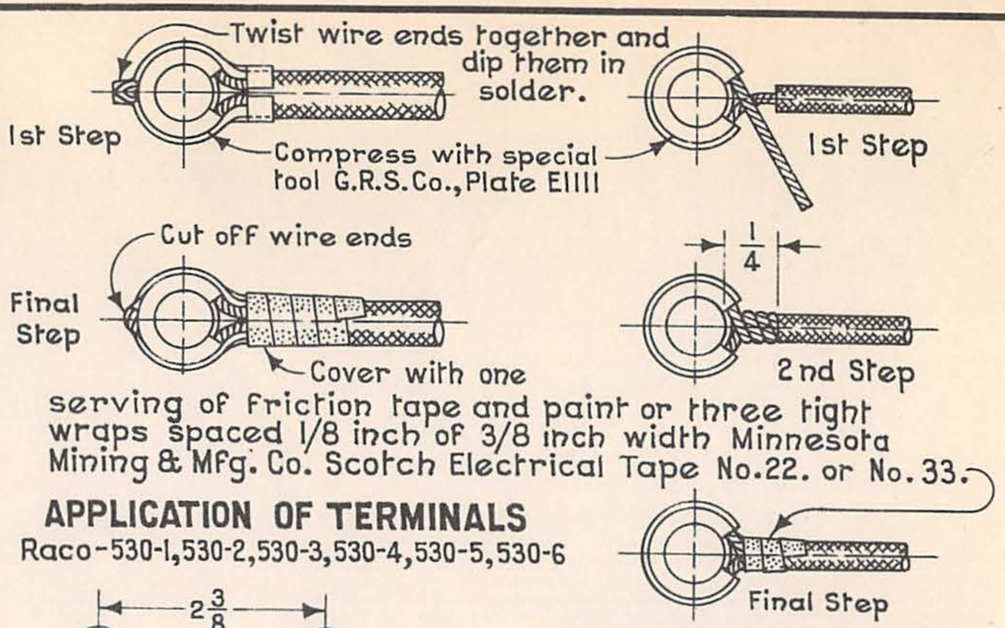
Approved by Representatives of Lines shown.

Chairman

RECEIVED
AUG
3
1943
SPECIFICATION DEPT.

	MANUFACTURERS REFERENCE NO. OR EQUAL	STRANDED CONDUCTORS		BINDING POST SIZE OR NO.
		A.W.G. WIRE SIZE	INSULATION OUTSIDE DIA.	
 WIRE EYELET	Raco. 5282	No.16 or 18	—	1/4" or No.14
	U.S.& S. 45303	No.16 or 18	—	3/16" or No.10
 WIRE EYELET	Raco. 5283	No.18	—	5/32" or No.8
	U.S.&S. 45301	No.18	—	1/8" or No.6
 BEE WIRE TERMINAL	Raco. 530-1	No.14,16 or 18	12/64" to 14/64"	1/4" or No.14
	Raco. 530-2	No.14,16 or 18	16/64" to 20/64"	1/4", or No.14 5/16 or No.20
	Raco. 530-4	No.12	16/64" to 20/64"	1/4" or No.14
	Raco. 530-5	No.14,16 or 18	10/64" or less	1/4" or No.14
 BEE WIRE TERMINAL	Raco. 530-3	No.9,10 or 12	24/64" or less	1/4" or No.14 5/16" or No.20
 BEE WIRE TERMINAL	Raco. 530-6	No.14,16 or 18	10/64" or less	3/16" or No.10
 3/4 11/32 11/16 3/16 CUP WASHER	Raco. Cup 289-1 Washer 289-3 Compl. 289-5	No.6,8 or 10	—	1/4" or No.14
 3/4 11/32 11/16 3/16 CUP WASHER	Raco. Cup 289-11 Washer 289-12 Compl. 289-10	No.6,8 or 10	—	5/16" or No.20

Printed in U.S.A.

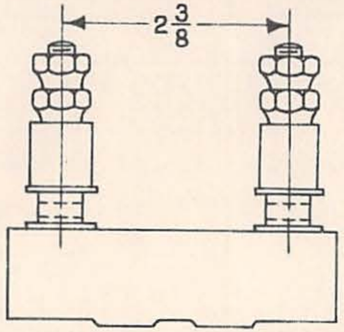

Twist wire ends together and dip them in solder.
1st Step
Compress with special tool G.R.S.Co., Plate E1111
1st Step
Cut off wire ends
1/4
Final Step
Cover with one serving of friction tape and paint or three tight wraps spaced 1/8 inch of 3/8 inch width Minnesota Mining & Mfg. Co. Scotch Electrical Tape No.22. or No.33.
2nd Step
Final Step

APPLICATION OF TERMINALS

Raco-530-1, 530-2, 530-3, 530-4, 530-5, 530-6

APPLICATION OF EYELETS

Raco — 5282 and 5283
U.S.& S.—45301 and 45303
For limited clearances



SPLIT POST TERMINAL

Raco-290 or equal.
For No. 4 A.W.G. solid or stranded conductors

NOTE:

Where necessary because of surface leakage, remove braid or other covering a sufficient distance to allow clip of terminal to be formed around rubber insulation. Rubber tape, paint, etc., to be applied over that part of the terminal clamped around the rubber insulation.

NEW YORK CENTRAL SYSTEM
SIGNAL AND TRAIN CONTROL COMMITTEE

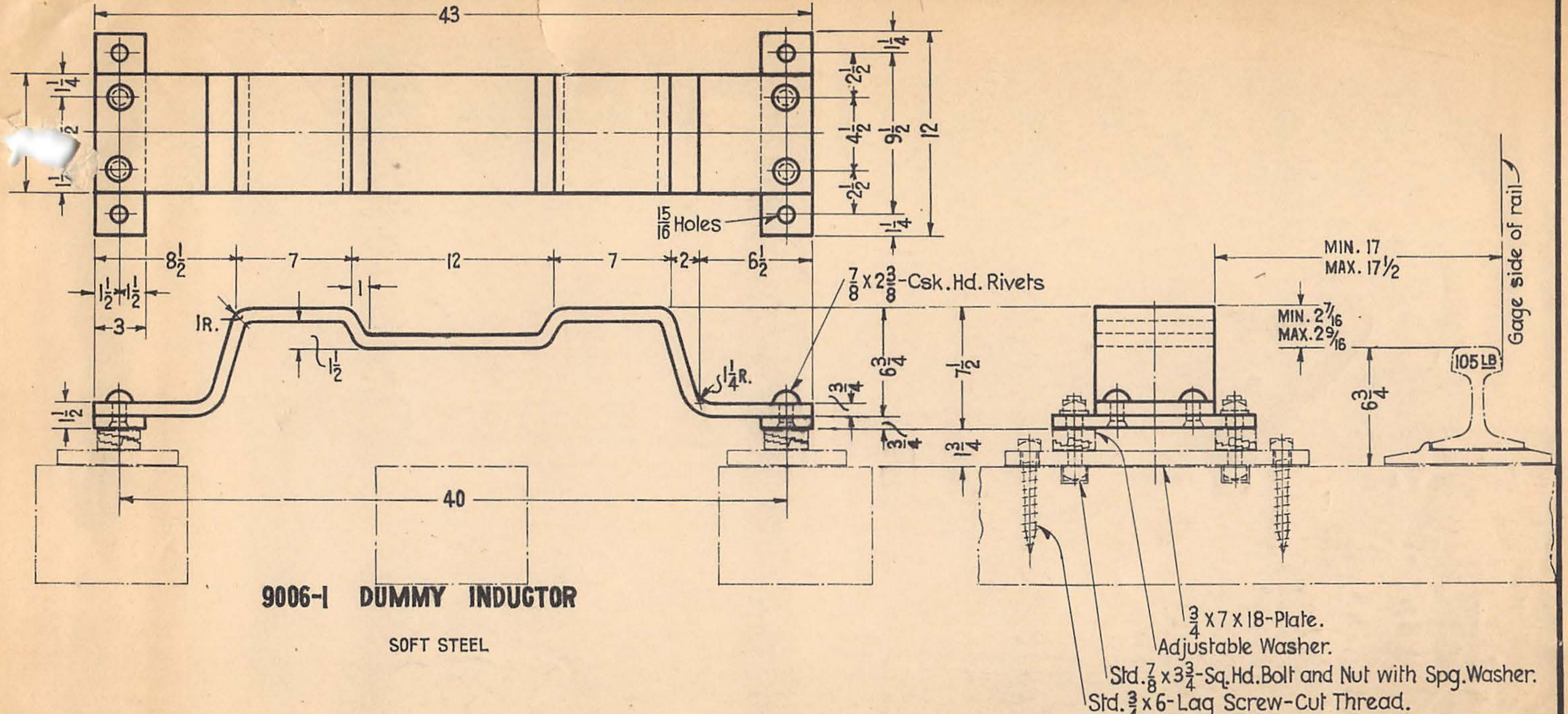
N.Y.C.R.R.
M.C.R.R.
C.C.C.&ST.L.RY.
B.&A.R.R.
P.&L.E.R.R.

6955C

1-25-1940
4-2-1945
11-1-1950

WIRE TERMINALS AND EYELETS

Approved by Representatives of lines shown.
Chairman.


43
1¼
2½
4½
9½
12
1½
15/16 Holes
8½
7
12
7
2
6½
1½
1½
3
1
1R.
1½
1¼R.
7/8 x 2 3/8-Csk.Hd.Rivets
6¾
7½
¾
¾
1¾
1½
40
MIN. 17
MAX. 17½
MIN. 2 7/16
MAX. 2 9/16
Gage side of rail
105 LB
6¾
3/4 x 7 x 18-Plate.
Adjustable Washer.
Std. 7/8 x 3¾-Sq.Hd.Bolt and Nut with Spg.Washer.
Std. 3/4 x 6-Lag Screw-Cut Thread.

9006-1 DUMMY INDUCTOR

SOFT STEEL

0 3 6 9 12

Scale and all dimensions given in inches

NOTE: When ordering give number and name shown in large type.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(OCL).
B.& A.R.R.
M.C.R.R.
C.C.C.& ST.L.RY.
P.& L.E.R.R.
RUTL.R.R.

9006

ISSUE	DATE
1	5-15-1930

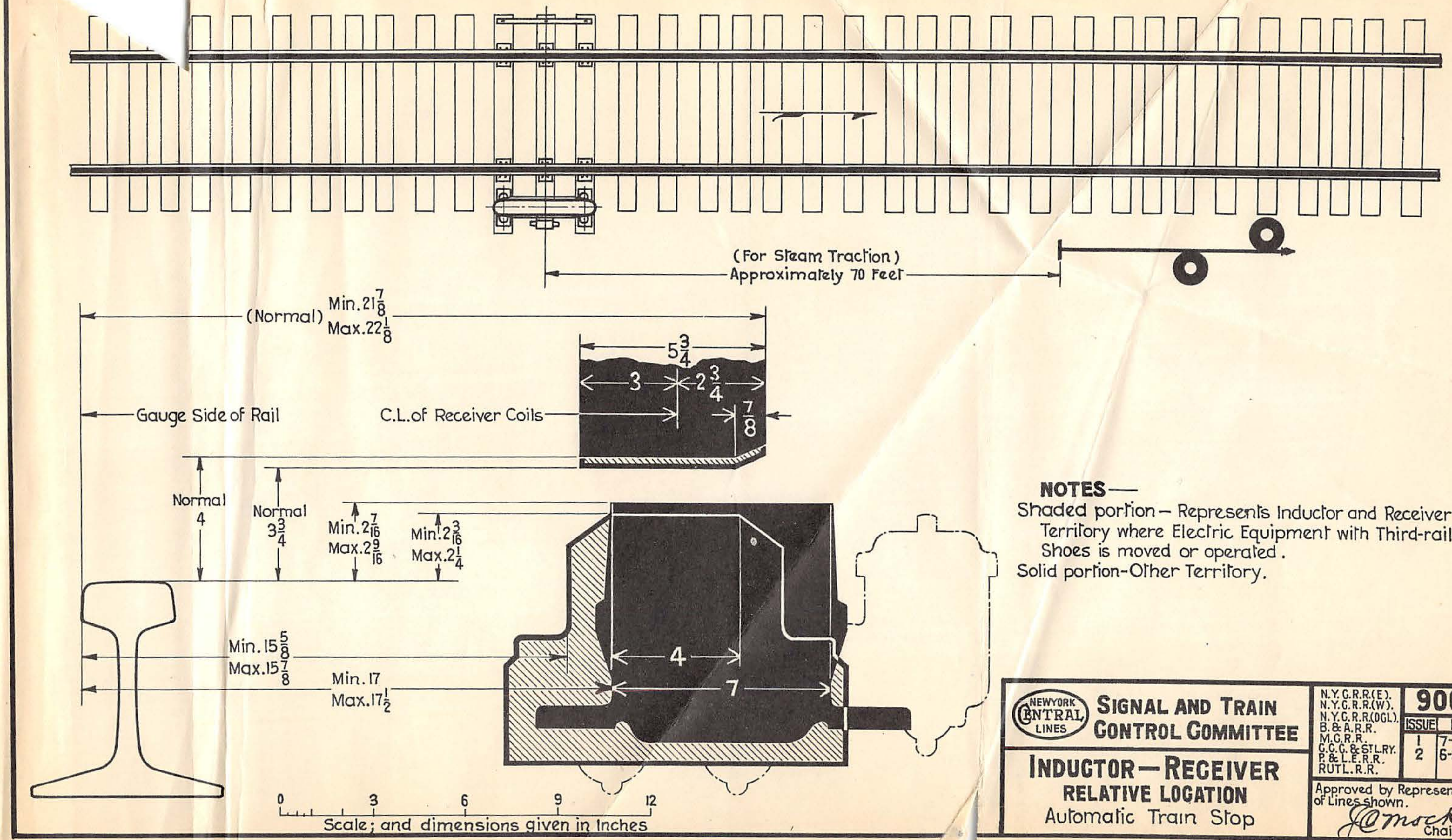
DUMMY INDUCTOR

FOR TEST TRACKS

Automatic Train Stop

APPROVED BY REPRESENTATIVES OF LINES SHOWN.

J.C. Moo


(For Steam Traction)
Approximately 70 Feet
(Normal) Min. 21 7/8 Max. 22 1/8
5 3/4
3
2 3/4
7/8
Gauge Side of Rail
C.L. of Receiver Coils
Normal 4
Normal 3 3/4
Min. 2 7/16 Max. 2 9/16
Min. 2 3/16 Max. 2 1/4
Min. 15 5/8 Max. 15 7/8
Min. 17 Max. 17 1/2
4
7
0 3 6 9 12
Scale; and dimensions given in Inches
WAH

NOTES—

Shaded portion— Represents Inductor and Receiver in Territory where Electric Equipment with Third-rail Shoes is moved or operated.

Solid portion-Other Territory.

NEW YORK CENTRAL LINES

SIGNAL AND TRAIN CONTROL COMMITTEE

INDUCTOR—RECEIVER
RELATIVE LOCATION
Automatic Train Stop

N.Y.C.R.R.(E).
N.Y.C.R.R.(W).
N.Y.C.R.R.(DGL).
B.&A.R.R.
M.C.R.R.
C.C.C.&St.L.RY.
P.&L.E.R.R.
RUTL.R.R.

9004

ISSUE	DATE
1	7-9-1929
2	6-24-1931

Approved by Representatives of Lines shown.

J.C. Mock
Chairman